Dental Abstracts

a selection of world dental literature

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Lon W. Morrey, D.D.S., editor
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AMERICAN DENTAL ASSOCIATION

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Dental Abstracts has these purposes

1. To present a selection of pertinent literature representative of all points of view within the profession;

2. To provide, by a few hours' reading each month, a survey of the significant advances being made by dentistry throughout the world, as reflected in current dental literature; and

3. To supply enough data in each abstract so that the reader may determine whether he wishes to refer to the original article for more complete information.

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Oral surgery

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Surgical technics

Precision-formed polyethylene implants for correction of mandibular contour

Burke B. Shevick. *Am.J.Surg.* 92:538-544 Oct. 1956

For 15 months the author has used precision-formed polyethylene mandibular implants to correct mandibular contour, with gratifying results. These implants are used in instances of micrognenia, without malocclusion, as a supplement to other surgical procedures intended to bring the mandible forward, and in certain instances of micrognathia with malocclusion in which surgical advancement of the mandible is not indicated because of the nature of the malocclusion and deformity. In all these conditions, the implants restored normal contour and increased the support of the advanced soft tissues over the mandible. This enabled the lips to meet more easily, improved the speech and reduced mouth breathing.

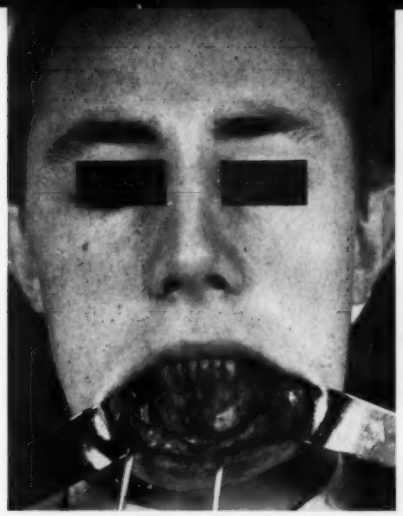

Figure 1 Exposure of anterior surface of mandible and neurovascular bundles

The patient is seated in a chair equipped with a headrest. The operator, using local anesthesia, incises the interdental papillas from first molar to first molar. Bilateral vertical incisions are made through the gingival mucosa from the interproximal space in front of the first molars to the inferior border of the mandible. With a periosteal elevator the soft tissues (including the peri-

Figure 2 Preoperative and postoperative views of patient with micrognathia with malocclusion despite prolonged orthodontic treatment

Figure 3 Preoperative and postoperative views of patient with mandibular contour defect corrected with precision polyethylene implant. Rhinoplasty enhanced final result

osteum) overlying the mandible between the vertical incisions are reflected downward from the gingival margin until the inferior border of the mandible is freely exposed. In the process the mental neurovascular bundles are easily exposed. They are dissected so that they will lie flat against the mandible when the impression is taken (Fig. 1).

An impression of the exposed mandible is made with Kerr's impression compound. The mucosa is tacked back into place with several sutures and a compression dressing is applied to the chin for 24 hours.

The positive impression, or cast, of the mandible is obtained by filling the negative with dental stone. This cast is retained for reference; a duplicate cast is made for working purposes. On the duplicate cast the mental neurovascular bundles, which extend from the mental foramen to the inferior border of the mandible, are trimmed away. (A sectional impression extending under the mental nerves obviates the need for this trimming and increases the accuracy of the cast.)

Using dental wax, the operator sculptures a model of the desired implant on the cast. Feathered extensions above and below the mental nerve establish the continuity of the margins of the implant to the surface of the mandible and enhance retention of the implant. Cephalometric roentgenograms and tracings help to determine the shape and dimensions of the model.

The wax model is invested in dental stone. The two halves of the mold are separated and the wax is removed. The implant then may be formed either by compression or injection molding; the latter method gives a smooth, satisfactory replica of the wax model. In the injection method a 3/8 inch hole is drilled from the top of the investing flask to the mold; molten polyethylene is forced through this sprue into the mold. The polyethylene should be heated to 300° F. before injection, but the mold should remain at room temperature. After the formed implant is recovered, it is trimmed and multiple holes are drilled to permit connective tissue ingrowth which will provide added fixation of the implant to the mandible.

Insertion of the implant is delayed one month to permit firm healing of the gingiva to the cervical margins of the teeth.

The soft tissues, including the periosteum, are elevated through a submandibular incision. The mental neurovascular bundles are exposed. A vertical midline incision may be necessary through the relatively inelastic bandlike periosteum to prevent it from pulling the soft tissues upward and thus creating a double chin effect. The implant is now inserted so that the lateral extensions of one end embrace the mental nerve, and the entire implant is carried slightly laterally. The other end is elevated and the implant is brought back to the midline where it should seat firmly. The subcutaneous tissues are closed with fine chromic catgut and the skin is closed

with fine silk suture. An elastoplast compressive dressing is applied for several days.

Only two complications occurred in this series of 20 patients. In one, a postoperative infection required the removal of the implant, but the implant was reinserted successfully after the infection had subsided. In the second instance the inferior margin of the implant had been overextended by the operator. The submandibular incision was reopened several months later and the excess polyethylene was easily removed with a scalpel. At this time it was observed that the implant was enclosed in a smooth, thin envelope of fibrous tissue with columns of connective tissue growing through the drill holes. The implant was fixed so firmly that it could have been removed only with considerable difficulty.

These implants can be constructed in any desired shape. When introduced with a strict, sterile technic, they are received well by the tissues, with little or no reaction. They will seat firmly and resist displacement. Detection of the implant by palpation is difficult.

The results with polyethylene mandibular implants have been far superior to those of former instances in which similar defects were corrected with autogenous iliac bone and cartilage or with preserved cartilage.

5225 Wilshire Boulevard, Los Angeles, Calif.

End results in parotid tumors

S. L. Perzik. *California Med.* 86:223-228 April 1957

Of 168 instances of parotid tumor treated surgically, with the patients observed postoperatively for periods of from one to nine years, there were nine deaths. Of the 168, 121 were mixed tumors, 29 mucoepidermoid tumors and 18 Warthin's tumors. The age range of patients with mixed and mucoepidermoid tumors was from 16 to 82 years; of those with Warthin's tumor, 48 to 83 years. The incidence of Warthin's tumor was considerably higher in men than in women; for mixed and mucoepidermoid tumors the converse was true. Warthin's tumors were located predominantly in the lower pole of the superficial lobe of the parotid gland and only 11 per cent in the deep lobe; the mixed and mucoepidermoid tumors were in the lower pole in a considerably smaller proportion of instances. These data suggest a Warthin's tumor if the patient is an elderly man and the lesion is encapsulated, is located at the lower pole of the parotid, and especially if, in addition, the tumor is somewhat soft and varies in size from time to time.

Subtotal parotidectomy was done in 128 of the 168 patients, and total parotidectomy in 40 patients. In only seven instances was radical neck dissection performed in continuity because of the presence of clinically involved nodes or an infiltrating primary tumor.

In no instance was there accidental injury of the main stem or a major branch of the facial nerve. Salivary fistula occurred in only 6.5 per cent of patients who had subtotal parotidectomy and all cleared spontaneously in from 15 to 87 days. Searching for and tying off major duct branches with nonabsorbable fine silk may have been an important factor.

There was only one local recurrence in a series of 103 instances, not previously treated, of mixed and mucoepidermoid tumors.

Most parotid tumors are well defined and limited by a so-called "capsule"—a condensation of the host fibrous stroma in the interstices of which are islands or clumps of tumor cells. The surgical objective is complete removal of the tumor and the "capsule." To do this, an intact shell of uninvolved parotid tissue around the palpable mass must be taken. It is only rarely necessary to do total parotidectomy to accomplish this purpose.

300 South Beverly Drive, Beverly Hills, Calif.

Some observations on the primary and secondary repair of the cleft palate

Randell Champion. *Brit.J.Plast.Surg.* 9:260-264 Jan. 1957

Primary repair of a cleft palate gives satisfactory speech results in about 60 per cent of patients. The secondary repair of cleft palates in school children and adults is a constant and difficult problem facing plastic surgeons.

The author considers that the pharyngeal muscles should be left undisturbed as much as pos-

sible. If a pharyngoplasty is undertaken, the mucous membrane only should be used. In primary and secondary repair of the palate the aim should be to lengthen the soft palate. In the standard V-Y closure of a cleft palate the palatal mucous membrane of the soft palate is lengthened by reflecting the mucous membrane from the hard palate and then suturing the hard palate mucous membrane in a more posterior position, incorporating some of it in the soft palate. The nasal mucous membrane is reflected from the medial and posterior edge of the hard palate but is not lengthened or transposed backwards in the same way as the palatal mucous membrane. Thus, with healing the palatal mucous membrane tends to return to its original position because there is no corresponding lengthening of the nasal membrane to maintain the lengthened velum.

The nasal membrane may be lengthened by undertaking a Z-plasty of the nasal mucous membrane. This small plastic maneuver is of utmost importance in the primary repair of a cleft palate and may make the difference between normal and imperfect speech. The Z-plasty also tends to reduce the palatopharyngeal opening. In a small percentage of primary repairs it is not possible to perform the Z-plasty, particularly in clefts involving most of the hard palate. Some lengthening of the nasal mucous membrane is always possible, however, by making a small incision at right angles to the pared edges of the soft palate about midway between the hard palate and the uvula. In the secondary repair of the palate the creation of a large Z-plasty or two smaller Z-plasties may influence the final result materially.

The secondary repair of the palate should be undertaken in two stages. At the first operation the palatal flaps are delayed and at the second operation the flaps are mobilized and sutured into their new position with a Z-plasty of the nasal mucous membrane; in addition a midline mucous membrane pharyngoplasty is performed.

A described technic was utilized in the secondary repair of cleft palates in 23 patients. Satisfactory results were obtained in all instances. Occasionally there has been a slight loss of palate flap. A residual hole in the hard palate in some instances has been unavoidable. Noticeable improvement in speech occurred in all patients.

Wythenshawe Hospital, Manchester, England

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Roentgenology

Problem of roentgenographic localization of impacted upper cuspids

(El problema de la localización radiográfica de caninos superiores incluídos)

P. Henríquez. *Gac.odont.* 2:357-366 April-May 1956

Roentgenographic localization of impacted upper cuspids is difficult. Prior to the removal of an impacted cuspid, its position should be determined as precisely as possible in order to select the adequate operation of minimal duration and of minimal trauma to the tissues.

Three methods for the roentgenographic localization of impacted upper cuspids using the customary dental equipment are available. The first method (stereoscopic roentgenograms) and the third (in which the roentgenograms are taken at perpendicular planes) have now been almost discarded because they are complicated and often give poor results. The second method (Clark's method) now is the most frequently used. It is based on geometric principles and it is theoretically exact. It requires the taking of two roentgenograms with horizontal displacement and the roentgen images move in apparently different relation to the position of the impacted cuspid.

Opinions as to the reliability of Clark's method for roentgenographic localization of impacted upper cuspids are varied. The author made experimental studies of impacted upper cuspids as follows: A model of an upper dental arch was prepared with transparent acrylic resin. The dental arch was provided with four natural upper incisors and with one natural upper cuspid. Another natural cuspid was placed in one of six different positions, simulating an upper impacted cuspid, and it was secured in the given position with wax. Four roentgenograms were taken of each position of the impacted cuspid (two by Clark's technic with displacement of the second roentgenogram, one in occlusal projection perpendicular to the film and the fourth in profile projection, an equivalent of the so-called "lateral cephalic projection"). All the roentgenograms were taken with periapical films.

The roentgenograms of four of the six positions localized the impacted upper cuspid correctly. In the other two positions, the localization suggested by Clark's technic was erroneous. Of the four roentgenograms taken by the Clark method in which the apparent movement of the roentgen image corresponded to the position of the ectopic cuspid as it was found at surgery, the movement of the roentgen image and its change of place were so minor in two of the instances that the data given for the operation were insufficient, suggesting that Clark's method in some instances is not sufficient.

The system is based on principles of plane geometry, but its application is based on principles of solid geometry and is complicated by such things as vertical angulations of periapical roentgenography. The localization of impacted upper cuspids calls for careful clinical studies and roentgenographic examination of (1) two or more periapical roentgenograms (Clark's method), (2) occlusal roentgenograms, and (3) roentgenograms taken in tangential oblique lateral position.

Los Caobos, Avenida Bogotá, Caracas, Venezuela

Planigraphy of the temporomandibular joint
(Planigraphie van het kaakgewright)

Thomas C. White. *Tschr.Tandheelk.* 64:241-251 April 1957

Roentgenograms of the temporomandibular joint made by the direct method are frequently of dubious diagnostic value because they are difficult to interpret.

Planigraphy (body section roentgenography) is a method of taking roentgenograms of plane sections of solid objects. Its main use in medicine and dentistry is to show the details in a predetermined plane of the body by blurring the images of the structure of other planes.

The technics used differ slightly, and have been termed stratigraphy, tomography, roentgen ray focusing, vertigraphy and laminagraphy. The roentgenograms are produced by movements of the films during exposure in a direction reciprocal and proportional to the simultaneous movement of the roentgen tube.

Recent studies at the Glasgow Dental School have led to a technic of making planigraphic films of the temporomandibular joints of patients sitting in an upright position. Many difficulties associated with the determination of the rest position of the mandible in prone patients are thereby overcome.

The anatomic difficulties in diagnosing and treating disorders of occlusion and of the temporomandibular joint are formidable. Planigraphy minimizes the overshadowing by intervening structures and produces the smallest degree of distortion.

In distoclusion, tracings of planigraphic films of the temporomandibular joint have been made before and after treatment with activators.

By use of a specially constructed head positioner, such as the one used at the Glasgow Dental School, the results of planigraphy have been satisfying and interesting.

211, Renfrew Street, Glasgow C. 2, Scotland

Teleroentgenography in orthodontics
(La cliché téléradiographique en orthopédie dento-maxillo-faciale)

Martin A. Schwarz. *Rev.mens.suisse odont.* 67:47-73 Jan. 1957

Teleroentgenography is a comparatively new technic which, unfortunately, is hardly used in dentistry. In contrast to the customary roentgenographic technics, in teleroentgenography the x-ray tube is placed at a distance of about six feet from the plate to obtain parallelism of rays and to avoid distortions.

Although Hotz has stated that he does not regard teleroentgenography or the use of profile angles and planes as substantial additions to the orthodontic armamentarium, these technics must be considered as valuable improvements.

Teleroentgenography aids the diagnosis in instances of malocclusions, fractures of the teeth and jaws, periodontal disease, and in locating foreign bodies and impacted teeth.

At the Dental Clinic of the University of Vienna, teleroentgenography is used in the following instances: (1) when disproportions exist between the teeth and their apical bases; (2)

when tooth extractions for orthodontic purposes seem indicated and a clear diagnosis is not obtainable by interpretation of roentgenograms taken by the usual means, and (3) where severe deformations exist, and the comparison with the standard profile appears to be necessary to obtain proper compensation.

In films or pictures taken by teleroentgenography, the parallelism of the rays is secured, and distortions, impairing the correct interpretation, are avoided.

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Fractures

Statistics on fractures of the jaws treated between 1948 and 1954

(Ergebnisse von Kieferbruchkontrollen im Zeitraum von 1948 bis 1954)

Heinz Köle. *Fortschr.Kief.Ges.Chir.*2:115-118, 1957

Between 1948 and 1954, 665 patients with various types of jaw fractures were treated at the Dental Clinic of the University of Graz, Austria.

Traffic accidents caused more than 60 per cent of these fractures. Fractures caused by bullets, and atrophic or spontaneous fractures, were comparatively rare.

Fractures of the lower jaws occurred three times oftener than those of the upper jaws.

About 50 per cent of these 665 jaw fractures were managed and controlled by wire splinting. In 35 per cent, a simplified technic—insertion of acrylic splints—was used.

Treatment failed in only seven instances. Four patients suffered from a disturbed occlusion, and in seven, the fractured bones did not heal satisfactorily.

Follow-up examinations revealed that in the majority of instances in which the teeth were situated directly at the fracture line, posttreatment extraction, mainly of molars, was required. Anterior teeth lying in the fracture line, however, remained functionally sound in all instances in which they were controlled properly.

In most instances of incomplete or partial dislocation of the fragments, or in severe fractures of the articular process, conservative treatment was the method of choice after elimination of the disturbances in articulation.

After the surgical repositioning of dislocated fragments—an operation that was performed in three instances only—subjective symptoms such as throbbing pain and increased sensitiveness of the oral tissues involved, and objective symptoms such as lockjaw or disturbed masticatory function, were observed. These symptoms appeared to be more severe than those occurring in 18 similar patients in whom conservative treatment methods were used.

Satisfactory results in treatment of fractures of the jaws can be obtained by various methods. At the Dental Clinic of the University of Graz, however, few complications were observed when conservative methods were used.

Auenbruggerstrasse 12, Graz, Austria

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Anesthesia and analgesia

The use of alphaprodine (Nisentil) as an analgesic in oral reconstruction

Martin R. Protell. *J.Dist.Columbia D. Soc.* 31:3-6 Dec. 1956

Alphaprodine, a synthetic analgesic piperidine derivative, was administered to 29 patients requiring the preparation of teeth for full coverage and to one patient requiring extraction of six maxillary anterior teeth and insertion of an immediate denture. The patients were men and women whose ages ranged from 24 to 70 years. The dosage was 48 mg., injected subcutaneously.

Five patients experienced no pain, 21 patients required regional anesthesia to alleviate pain for one or two sensitive teeth, and four patients required complete nerve blocks. Most patients experienced a sense of well-being. Only one patient showed respiratory depression which was slight and brief. The following side effects were noted: dizziness, six patients; headache, three;

nausea, two, and vomiting, respiratory depression and mental confusion, one patient each. All patients were ambulatory and were able to leave the office on completion of the therapy. In all patients the cough reflex was normal, and all reacted to directions and guidance.

Two tablets of either dimenhydrinate or meclizine hydrochloride were prescribed for all patients, to be taken one hour before arriving at the office, to counteract dizziness, the most frequently observed side effect.

It would appear that alphaprodine is worthy of consideration as an analgesic in dental procedures to help reduce pain, anxiety and psychological trauma.

667 Madison Avenue, New York, N.Y.

Yoga trance instead of anesthesia
(Joga-Behandlung anstatt Anästhetika)

F. Weber. *Neues Zahnhk.* 3:81-82, 1957

Yoga, the diversion of the senses from the external world and the concentration of thought on a specified object, is employed frequently by Hindu dentists for the alleviation of pain during tooth extractions and minor surgical interventions in the oral cavity.

According to the Hindu philosophy of Sankhya, yoga attains miraculous powers and control of nature by hypnotism or self-mortification. A profound and abnormally prolonged sleep can be obtained by use of the following yoga procedures: (1) devotional (bhakti); (2) intellectual (jnana); (3) physical (hatha), and (4) suggestive (karma). The three stages of yoga trance used mainly in Hindu dentistry are as follows: (1) attentive (dharana); (2) contemplative (dhana), and (3) concentrative (samadhi).

Some Hindu dentists prefer yoga to drug anesthesia. These dentists move the heads and necks of their patients rhythmically and slowly until a sleeplike condition of profound abstraction of mind and spirit is obtained. The patient's conscious and later subconscious attention is directed exclusively on a certain object, abstract or concrete, thereby attaining complete control over the natural forces of anxiety and pain.

The yoga trance, which is similar to that occurring in profound hypnosis, consists of limited sensory and motor contacts with surrounding subjects and of subsequent loss of memory of all that happened during the trance condition—tooth extraction or surgical intervention. The trance can be obtained quickly in the majority of patients.

Friedrich Strasse 49, Kaiserslautern, Germany

Clinical effectiveness of local anesthetic solutions in dental procedures

Sidney Epstein and Neal W. Chilton. *Internat. A.D.Res. Preprinted Abst.* 76 March 21, 1957

A study of the clinical effectiveness of local anesthetic solutions in dental procedures was undertaken in four dental facilities of the U.S. Army, with the knowledge and approval of the military service but not as an official activity. Anesthetics were administered by seven dental officers using a standardized procedure and recording system and the double blind technic.

The anesthetic solutions were procaine hydrochloride 2 per cent, procaine hydrochloride 4 per cent, lidocaine hydrochloride 2 per cent, and meprylcaine hydrochloride 2 per cent, all with epinephrine hydrochloride 1:50,000 as a vasoconstrictor. Nine hundred and six injections were given for exodontic, periodontic and operative dental procedures. Infiltration and nerve block technics were used.

Analysis of the data disclosed no statistically significant difference among the various solutions employed with respect to success or failure in the elimination of pain during the dental procedures undertaken, or with respect to onset of anesthesia. The onset, however, was more rapid with the infiltration technic than with the inferior alveolar nerve block technic. Lidocaine hydrochloride produced an anesthesia of much longer duration than did any other solution employed. Reactions occurred which might be ascribed to the local anesthetic solutions used. Reactions were most frequent with procaine hydrochloride 2 per cent, and least frequent with meprylcaine hydrochloride.

516 Sutter Street, San Francisco, Calif.

Professional activities

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Education

The Dental Clinic and Polyclinic of the University of Heidelberg

(Die Universitätsklinik und Poliklinik für Mund-, Zahn-, und Kieferkranke Heidelberg)

Arthur Glinz. *Deut.Zahnärztebl.* 11:109-112 Feb. 22, 1957

The Dental School (Clinic and Polyclinic) of the University of Heidelberg, Germany, was founded in 1895 as a part of the Medical (Surgical) Clinic of the University.

In 1900, this school [in Germany, dental or medical schools are called "clinics of a university"] became an independent unit and was housed in two apartment buildings provided by the university.

The increase in the number of students and patients necessitated the erection of new buildings which were completed in 1903. These buildings still house the dental school. The close association of the school with all types of medical clinics provides an exceptional opportunity for the student to appreciate the relation existing between dentistry and medicine.

Dental study is divided into preclinical and clinical courses, each consisting of five semesters of eight months' duration. The preclinical education includes dental anatomy, dental material, history of dentistry, dental pathology, pharmacology, public health and dentistry, and practice management.

The clinical courses consist of operative dentistry, oral surgery, local and general anesthesia, orthodontics, pedodontics, periodontics, prosthetic dentistry, preventive dentistry, roentgenology, biology, biochemistry, physiology, psychology, pharmacology, professional ethics, clinical practice and forensic dentistry.

In the final semester, a special course on general medicine is added to provide the dental student with a broader understanding of problems and procedures involved in the practice of medicine. This course prepares him to cooperate intelligently with physicians and also to render a better service to his patients through his ability to recognize symptoms of general diseases which require treatment by physicians.

The clinical training is provided by five departments, headed by renowned specialists.

The degree conferred by the Faculty of Dentistry is that of Doctor of Medical Dentistry (Dr.med.dent.).

In 1947, 174 students attended the dental school, 114 men and 60 women. The majority were Germans (143), and the others (31) came mainly from the East European countries.

In 1956, the attendance decreased slightly. Only 151 students attended the school, 100 men and 51 women. The majority were Germans (117, of whom 73 were men and 44 women), and the rest foreigners (34, of whom 27 were men and 7 women) mainly from the Scandinavian countries and Iran.

The city of Heidelberg survived World War II practically untouched. It lies between lofty hills covered with old forests and vineyards, where the Neckar River leaves the gorge and enters the plains of the Rhineland. Heidelberg castle, one of the most beautiful architectural monuments of Germany, towers above the city.

The University of Heidelberg was founded by the Elector Rupert in 1385. The buildings of the university resemble those of the University of Paris.

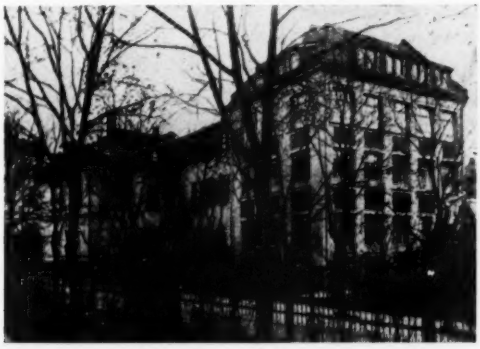
The large library of the university includes also the dental library, one of the best in Germany.

At the time of the Reformation, the University of Heidelberg became one of the strongholds of Protestant learning. Damaged by the Thirty Years' War, the university led a struggling existence for 150 years after the war, and many of its endowments were cut off by the peace treaty of Luneville in 1801.

The old dental school as a part of the Surgical Clinic (now the Institute for Dermatology) in 1895

Left: The apartment building in which the dental school was located in 1900

Right: The same building after reconstruction. The prosthetic department of the dental school is still located in this building



The main building of the dental school since 1908

Later, the university again became one of the outstanding European schools.

The city of Heidelberg, with a population of 116,500 (1950), is one of the most beautiful cities in Germany.

In its neighborhood, the oldest human fossil remains, among them the "Heidelberg mandible," were found in 1907.

Hospitalstrasse 1, Heidelberg, Germany

A look into the future of dental education

Kurt H. Thoma. *J.Connecticut D.A.* 31:6-8 Jan. 1957

Four outstanding developments have widened the dentist's knowledge of oral and dental diseases and their treatment.

The first was the recognition of the far-reaching importance of oral hygiene. Fones presented his brilliant idea that the public could best be served by means of auxiliary personnel, the dental hygienist, whose function should be to prevent dental disease through carefully supervised prophylactic measures. He rendered mankind a great service by initiating a school for dental hygienists.

The idea that a clean tooth does not decay has stood the test of time. The removal of deposits on the teeth, combined with gingival massage, is still the best means to prevent periodontal disease. The best preventive treatment for gingivitis remains the consistent and proper use of the toothbrush.

Another milestone was the discovery of the effect of dental infection on the rest of the body. The belief that dental diseases are of a purely local nature had to be abandoned. Clinical investigation and experimental work led to the discovery that the development of many oral and dental diseases depends on predisposing factors of a systemic nature, and that many lesions are but symptoms of somatic disturbances.

The fourth and greatest development has been the establishment of the various dental specialties on solid ground.

A good foundation in the basic sciences is necessary to understand the effects of endocrine, nutritional, metabolic, dermatologic and neoplastic influences which promote or modify dental and oral health.

The Harvard Plan was designed to meet these requirements, but unfortunately the plan was never put completely into effect. The administrating officer held the view that the general practitioner should do everything, and that research would solve all problems.

It would be desirable for several universities to establish graduate dental departments, similar to that of the Graduate School of Medicine of the University of Pennsylvania. Graduate schools should not only offer opportunities for special training but should provide basic science courses on a higher level which should be taken by medical and dental graduates together. Each department also should have a program best suited to prepare the graduate for his future work, and should offer courses that will fulfill the requirements of the specialty examining boards. Some of this training should be given in associated hospitals.

Rotating internships in dentistry should be arranged for the general practitioner.

Some day a benevolent foundation may supply the funds to establish an International Institute of Dental Science where graduate students and teachers from all nations may congregate to discuss, investigate, learn and teach, so as to improve the oral health of the people of the entire world.

1180 Beacon Street, Brookline, Mass.

The new Forsyth

Editorial. *New England J.Med.* 256:859-860 May 2, 1957

The contribution of dentistry to human happiness cannot be exaggerated, but the primary unabated mechanical attack on the disorders of the teeth has had its limitations. For some time leaders of the dental profession have expressed an awareness of the unsatisfactory approach to most dental problems, notably dental caries. Many dental schools have placed more emphasis on basic science, fundamental research and preventive measures. The Forsyth Dental Infirmary for Children in Boston has been taking soundings and has now made a decision to rechart its course and place

equal or greater emphasis on research in the prevention of dental disease.

Forsyth has become affiliated with the Harvard School of Dental Medicine, and John M. Macdonald has been appointed director of the new institute. His appointment as professor of oral microbiology in the Harvard School of Dental Medicine makes him the first of the new Forsyth staff to carry academic status and thus assure intimate cooperation with Harvard University. Dr. Macdonald was chairman of the division of dental research and professor of bacteriology in the Faculty of Dentistry at the University of Toronto.

The challenges that confront the director of the new Forsyth Institute are formidable. Perhaps the greatest is the quest for the control and prevention of dental caries. This is one of the chief objectives of the Institute, and a battery of talents will be solicited to study this intricate problem. Progress has already been made by the use of the tracer element, fluorine, and it is the consensus that with modern technology this disease will finally surrender.

Extensive structural changes must be made in the Forsyth marble edifice, to equip it with modern laboratories and facilities for all types of investigation as well as for dental care.

Recruits are scarce in the field of dental investigation, since few young men have been trained in this specialty of dental medicine. Men with scientific training in allied fields probably will be drafted.

140 The Fenway, Boston, Mass.

▼ Hospital dental service

The dentist in the hospital operating room

M. Michael Cohen. *J.Den.Children* 23:201-203 Fourth quarter 1956

Since the advent of Blue Cross and Blue Shield and their inclusion of dental services, the number of dentists seeking hospital privileges has increased. In 1949 in Massachusetts, about 80 dentists were members of Blue Cross and Blue Shield and had courtesy hospital privileges; at present over 1,000 dentists have staff or courtesy privileges. With the growing demands for dental care of the handicapped child, an additional increase can be expected.

Many dentists have had no training in hospital procedures and operating room technics. An operating room technic is described which will meet with the approval of the medically trained surgeon.

All modern operating suites have a dressing room where the dentist can undress and select a scrub suit to fit his body build. Cotton socks are best. Nylon socks and stockings are acceptable if they are conductive without the shoes on. Nylon underwear is satisfactory if it touches the skin, but cotton underwear is preferable.

A pair of conductive shoes or booties, or leather soled shoes with conductive strips placed on the inner sole, should be worn. The conductivity of shoes or booties should be checked on a conductometer on arrival in the morning and again in the afternoon.

The cap should cover all the hair. Turbans are more effective for women than caps and are easily made and put on.

The surgical mask should be washed, dried and brushed to free it of lint. It is then placed over the nose and tied about the face. If glasses are worn a strip of soft copper or aluminum should be inserted into the hem along the upper edge of the mask and bent to conform to the nose, so that the expired air will be deflected and will not fog the lenses.

The nails should be cleansed and manicured, after which every surface of the hands should be scrubbed thoroughly for at least seven minutes. Ethyl alcohol 70 per cent is rubbed in the hands for one minute, and benzalkonium chloride is rubbed in for from one to three minutes. The hands and arms should be dried beginning with the fingers, with a sterile towel.

The gown is passed collar uppermost by an attendant and grasped with the right hand. The collar is grasped with the left hand and is unfolded at arms' length, to avoid contamination from the front of the scrub suit. The ends of the collar are grasped in either hand and the gown is shaken vigorously to open the arm holes and make them easily accessible. The gown is tossed

into the air and caught by thrusting the extended hands into the sleeves. The arms are adducted across the chest and rotated outward. In this position they slide readily into the sleeves. When the fingers reach the region of the elbows they are extended and the arms are abducted. The hands then slip through the sleeves and cuffs. The circulating nurse grasps the back corners of the collar, pulls the gown upward and backward over the shoulders, ties the tapes in back, and smooths the gown by jerking down the bottom hem.

The scrub nurse opens the sterile packet of gloves. The sponge containing the talcum is picked up and used as a puff to powder the hands. One of the gloves is grasped by the inverted cuff and the fingers of the opposite hand are insinuated into it. The opposite glove is picked up by slipping the gloved hand behind the inverted cuff to hold the glove while the other hand is inserted.

Boston Floating Hospital, Boston, Mass.

Sunderland Hospitals Dental Service

Brit.D.J. 102:80-81 Jan. 15, 1957

In his address at the opening of the Dental Department of the Sunderland General Hospital on December 14, The Rt. Hon. Robin Turton, the Minister of Health, said that this marked the inception of a pilot scheme designed so that certain aspects of the provision of dental treatment in hospitals could be studied. Comprehensive dental treatment is to be given to all long-stay inpatients; short-stay patients will receive emergency treatment and any other dental treatment considered necessary as part of their medical care. Provision is to be made for specialist diagnosis and treatment of outpatients and for the routine treatment of patients with open pulmonary tuberculosis.

The Minister hoped that the scheme would afford information which could be applied to the hospital service as a whole, for surveys had shown that there was an extensive need for dental care among patients in every kind of hospital. He expressed appreciation for the cooperation of the British Dental Association.

Proposing a vote of thanks to the Minister of Health, Professor Robert Bradlaw said that, 12 years before, the Teviot Committee had advised that comprehensive dental treatment should be given as part of the National Health Service, and had urged that priority should be given to those who were in particular need of dental care and who could benefit in a special way from it.

A survey of the dental condition of hospital patients in the region had shown an alarming state of affairs. Of a random sample of children from 3 to 16 years of age in a long-stay hospital, 86 per cent had required dental treatment; there had been a similar need in a tuberculosis sanatorium where, on the average, each patient needed three teeth extracted, two filled, and artificial dentures to replace six teeth. The incidence of dental disease in other hospitals was little better, and more than 10 per cent of patients had been found to have gross dental sepsis.

The pilot scheme, said Professor Bradlaw, would not in any way replace the private dental practitioner, the school dental officer or the maternity and child welfare dental clinic and was not intended to; it was to supplement and work with these in an integrated dental service.

The Dental Advisory Committee will regard the opening of the Dental Department of the Sunderland General Hospital as an earnest of the Minister's appreciation of what dental surgery can contribute to the health services of the country and an opportunity to take a place side by side with the other specialties of medicine and surgery.

13 Hill Street, Berkeley Square, London W. 1, England

Dentistry in hospitals

Rudolph H. Friedrich. *Hospitals* 31:36-38, 52-54 May 1, 1957

To render better dental health care to larger segments of the public will require a greater use of hospitals. A third (2,000) of the hospitals in the United States today provide some form of dental service. The largest percentage of these are hospitals of 500 or more beds. More long-term hospitals than short-term hospitals provide dental

services. Dental services are available in from 50 to 90 per cent of the long-term general, psychiatric, tuberculosis and federal hospitals, and in 25 per cent of the short-term acute disease hospitals.

The medical and surgical services of the hospital provide an excellent environment for the management of the more complicated acute dental and surgical problems which are within the purview of the dentist. The available laboratory service and medical consultations aid in evaluating the primary cause of admission. Other benefits of the hospital include the operating room, the availability of endotracheal anesthesia, and fine supportive postoperative care. With the benefits of the hospital regimen and the support of antibiotic therapy, the patient requiring extensive oral surgery may have the treatment completed in one episode rather than in stages. This service is extremely beneficial to the patient requiring multiple extraction of teeth and the preparation of the alveolar ridges for artificial dentures. The hospital environment is ideal for the management of complicated fractures of the jaws, treatment of subluxations of temporomandibular joints, removal of foreign bodies from the maxillary antrum and the soft tissues of the mouth and for closure of oroantral fistulas.

An estimated 5,500,000 people have long-term chronic illness (lasting more than three months). As a group they are amenable to treatment in the private dental office.

The private dental office generally is not equipped or staffed to treat physically and mentally handicapped patients, and there is no indication that the development of this service is economically feasible. Experience in mental hospitals and crippled children's hospitals indicates that the hospital is the logical base for the routine dental health care of the handicapped person if dental health care is to be rendered efficiently and at minimum cost. The dental profession is aware of its responsibility in this field, but it also recognizes the responsibility of the community and the hospital.

The American Dental Association recommends that "in smaller hospitals with less than 74 beds, and in those hospitals where the principal activity of the dental department is oral surgery, this service may be organized as a section of the surgery department coequal with the other surgical specialties."

In larger hospitals where the program includes a broader scope of long-term health services, the Association recommends that the dental service should be established as a department of dentistry, and that it should be organized into sections in conformity with recognized dental specialties.

222 East Superior Street, Chicago 11, Ill.

▼ Trade and laboratory relations

Dental laboratories in the Philippines

Jesus A. Lim. *Philippines M.D.J.* 2:18-19 Sept. 1956

With the advances in dental science in the Philippines, several dental laboratories were organized independently of dental offices. The author, in 1954, helped to form the nucleus of the organization now known as the Philippine Association of Dental Laboratories (PADL), which has the following aims: (1) to elevate the standard of dental laboratories and technicians; (2) to establish minimum requirements for ethical laboratories; (3) to effect a closer cooperation between dental laboratories and the dental profession in the field of new technics and materials; (4) to report to the Philippine Dental Association for proper action the names of "fly-by-night" laboratories practicing "bootleg" dentistry; (5) to set minimum prices among dental laboratories, and (6) to confer with the government, the Philippine Dental Association and others regarding the dental laboratory trade.

One of the problems of local dental laboratories is the inadequacy of dental materials on the market, especially casting gold. This is because of the restrictions on imports.

Another problem is the patronage given by some dentists to small laboratories which offer "cutthroat" prices for prostheses of low quality. It is this same group of laboratories that competes with dentists by practicing "bootleg" dentistry.

A third laboratory problem involves the poor impressions and models presented by some dentists who are reluctant to use modern impression materials and technics.

Soon after formation of the PADL, the president of the Philippine Dental Association commended the organization and promised to suggest that dentists patronize members of PADL. The Philippine Dental Association promised to form a committee to check on the standards set up by PADL.

240 Wellington Building, Plaza Binondo, Manila, Philippine Islands

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Auxiliary groups

Professional schools for dental assistants in Germany

(Die fachliche Ausbildung der zahnärztlichen Helferinnen in den Berufsschulen)

Eugen Fröhlich. *Zahnärztl.Mitt.* 45:224-227 April 1, 1957

The introduction of a compulsory professional school system for dental assistants seems to be one of the most significant steps in German dentistry.

The two-year curriculum, based on the proposals of the German Dental Association (Bundesverband der deutschen Zahnärzte), recently was published by the German Ministry for Public Education.

It contains the following courses: (1) dental equipment; (2) pharmacology; (3) dental materials; (4) basic sciences such as anatomy, chemistry, hygiene, pathology, physics and physiology; (5) dental terminology; (6) first aid, accident prevention and artificial respiration, and (7) analgesia and anesthesia.

In the past, the dental assistant's lack of knowledge has frequently caused serious mistakes and omissions in dental practice. The professional schools for dental assistants will not only double the number of well-trained persons available for employment but will increase their usefulness in routine dental practice.

Klinikumsgasse 12, Tübingen/Neckar, Germany

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Interprofessional relations

What the dentist thinks of the M.D.

Ray Cobaugh. *Odont.Bul.(West.Pennsylvania)* 35:9-12 Dec. 1956

The dentist thinks of the M.D. (the physician) as the natural and rightful leader of the healing professions. Although the medical profession jealously guards its right to provide this leadership, it does not always accept its responsibility to provide it; when no leadership is forthcoming, the dentist feels frustrated.

The dentist believes the physician has built a great and good organization for the medical profession. Dental organizations emulate the medical societies. Organized dentistry rarely considers a public health measure or a legislative proposal without asking: What does the medical society think of this?

The dentist thinks the physician gives entirely too little consideration to the dentist and the dental profession in health or health programs. Often when this oversight is brought to the attention of the physician, he blandly says: "I am certainly glad you brought this out; it never even occurred to me." The sad thing is that he is telling the truth.

Many physicians do not hesitate to pontificate on nonmedical subjects. Dentists, too, are guilty of the same fault.

The dentist believes that the physician is the most powerful factor in keeping the professions free of government control. The dentist respects the physician's attitude toward government control. The dental profession frequently sides with the medical profession whenever professional freedom is in jeopardy.

The dentist believes the physician should re-evaluate the relations existing between the two professions. Most dentists assert that they are never quite accepted by physicians as professional equals in considering health problems.

Present attitudes have their roots in the past. The first dental school on a college level appeared in this country only a little more than a century ago, whereas the traditions of the medical profession go back thousands of years. Today the college training required by the average dental graduate approximates in time, expense and intensity that of his medical colleague.

The dentist believes that he and the physician are being brought closer together by such factors as the physician and dentist draft law, the Veterans Administration, the health departments, the Children's Bureau, the United States Public Health Service, and the growth of welfare funds of organizations.

The dentist, the physician, the pharmacist and the hospital administrator may come to accept that "an injury to one is the concern of all."

217 State Street, Harrisburg, Pa.

▼ Dentistry around the world

Dentistry in Jordan (Zahnärzte in Jordanien)

Ch. Böhne. *Zahnärztl.Praxis* 7:11 Dec. 1, 1956

Jordan, formerly called Transjordan, is a kingdom in the Near East and lies at the northwest corner of the Arabian peninsula. In an area of about 45,000 square miles lives a population of about 1,500,000, mainly Arabs.

The Jordanian Dental Association was recently organized in Amman, the country's capital, but many of the 40 college-educated dentists do not belong to the new organization.

Because of many factors such as the widespread activity of medical and dental charlatans, and the low living standards of the population combined with an unbelievable poverty in the lower classes, the development and advance of Jordanian dentistry are severely handicapped. No dental school or clinic, no scientific library and not even a public health service exist in Jordan.

Several of the 40 practicing dentists have studied at European dental schools; others completed their professional training at the dental schools of Beirut (Lebanon), Damascus (Syria) or Cairo (Egypt).

All dental appliances, instruments, materials and textbooks must be imported.

Ludwigstrasse 20, Fürstenfeldbruch/Munich, Germany

Dentistry in Soviet Russia (Der Zahnarzt in der Sowjetunion)

H. Müller-Dietz. *Zahnärztl.Rundschau* 65:453-454 Oct. 5, 1956

In the Union of Soviet Socialist Republics, as in most other countries, two professional groups are active in the field of dentistry: dentists and dental technicians.

The dentists are divided into two subdivisions: (1) dental specialists and academicians who, after a five year study at a dental college (attached to a university), have undergone extensive training in one or more of the branches of dentistry (endodontics, periodontics, orthodontics, pedodontics, prosthetics, oral surgery or plastic facial surgery) or have served as teachers at a dental college for at least three years, and (2) practicing dentists who have passed successfully the final examinations of a dental college, interned at a dental clinic, and who have been in dental practice for at least three years.

The activities of dental technicians are limited strictly to the construction of artificial dentures and other restorations under supervision of a dentist. Dental technicians, belonging to the "lower medical personnel," have to study at least two years at an institute for dental technicians.

The field of dentistry in Russia has been increased recently and includes now all regions of the human face and skull.

The activities of dental practitioners consist of (1) conservative treatment and tooth extractions; (2) treatment of periodontal disease, gingivitis, stomatitis, and other diseases of the oral cavity;

(3) treatment of inflammation of the jaws and the temporomandibular joint, osteomyelitis, phlegmons and oral and facial tumors; (4) treatment of neuralgic afflictions of the maxillofacial system, and (5) oral surgical and plastic surgical interventions, construction and insertion of inlays and fillings, and endodontic, orthodontic, pedodontic and prosthetic procedures.

In 1955, five medical dental institutes (Moscow, Chardzhou, Leningrad, Kiev, and Irkutsk) and four independent dental departments of the medical faculties of the universities of Molotov, Tiflis, Riga, and Kaunas, provided dental education.

The Soviet government awards scholarships to the majority of dental students, and expects complete subordination to the Russian system. No possibility exists for private medical or dental practice. The graduate receives from the Ministry for Public Health an order to practice at a certain community, at a state or federal hospital, or at a dental school clinic.

The Soviet Army trains its medical and dental officers in 16 Army schools.

In larger cities of the U.S.S.R., there are 10,000 dental clinics with more than 20,000 dentists employed full time, and in rural areas only 7,000 dentists practice.

There is still an urgent need for more and better educated dentists, especially in the rural regions and in the eastern parts of the Union of Soviet Socialist Republics.

Fasanenstrasse 61, Berlin W 15, Germany

Czech gift of mobile clinic to India

J.All India D.A. 29:46-47 Feb. 1957

A great handicap of the vast rural population of India is the almost complete lack of any facilities for dental treatment. The Czechoslovakian government has made a welcome gift of a mobile dental clinic to Dr. Radhakrishnan, vice-president of the Republic of India. The mobile dental clinic is a self-sufficient unit; it has equipment to generate electric power, has its own water tank, and facilities for all kinds of dental work.

The unit consists of a truck and a trailer. The truck is powered by a "Skoda" diesel engine, and it contains a waiting room, consultation room, two dental units, x-ray apparatus, surgical shadowless lamp, electric hot air and water sterilizers, hot and cold water, refrigerator, radio receiver, darkroom for developing roentgenograms, air conditioner and pump. The roof of the truck may be cooled by sprinkling water on it. The trailer houses a laboratory equipped with the necessary instruments and apparatus for prosthetic work. It houses an electric generator driven by an air-cooled gasoline engine. The electric current thus produced is sufficient to operate all the equipment and to provide lighting. The trailer also has a rest room.

Both truck and trailer are equipped with stabilizing jacks which can be put to use when the mobile dental clinic has reached its destination, to give the clinic a stable base.

General Assurance Building, 232, Dr. Dadabhai Navroji Road, Bombay 1, India

Stomatological conference in P'yongyang

(Pervaia konferenciia stomatologov v Phenjang)

V. F. Rudko. *Stomat.,Moscow* 35:66 Jan.-Feb. 1956

The first conference of stomatologists, dentists and dental technicians organized by the Ministry of Health of the Korean People's Democratic Republic (North Korea) was held May 26-27, 1955, in P'yongyang. Red Cross representatives of the U.S.S.R. and of several people's democracies also attended.

Among the subjects discussed were problems of dental service to the North Korean people, principles of maxillofacial surgery, methods of anesthesia for dental operations, and plastic surgery for mandibular defects.

Dr. Simoff, a Bulgarian stomatologist, reported on treatment of the teeth and oral mucosa. Dr. Sosnin of the U.S.S.R. discussed the organization of stomatological service in his country. The author reported on the progress of surgical stomatology in the U.S.S.R.

Plans were completed for developing stomatological service and research in the Korean People's Democratic Republic.

Petrovka 12, Moscow, U.S.S.R.

Armamentarium

▼

Instruments

An air-driven dental handpiece with manual speed control

(Luftdriven borrmaskin med manuell hastighetsregulator för alla hastigheter upp till 50.000 varv per minut)

I. Norlen. *Svensk tandläk.Tskr.* 49:553-563 Oct. 1956

Lieban (1955) found that grinding speed and pressure are two factors which affect the generation of heat. Rapid grinding with light pressure will not create the amount of heat that will be generated by heavy pressure in slow grinding.

Even if it is possible to increase the speed of the conventional dental drill to from 10,000 to 20,000 rpm, the vibration created by the cord transmission and the inconvenience of the foot control contraindicate its use.

In order to utilize the advantage of a high-speed instrument, a pneumatic turbine-driven handpiece has been designed and constructed by the author in collaboration with Erik Wijkström and Atlas Copco AB.

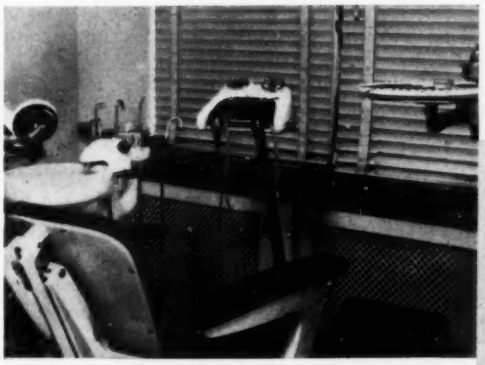
The instrument consists of a suspension unit, which includes a reduction valve, a manometer and two stopcocks, and of two separate turbines, one connected to a straight handpiece, the other to a contra-angle, each with its own air lead. The handpieces are removable and have standardized sockets, so that essentially only one turbine is necessary. For ease of operation, however, one for each handpiece is to be preferred, as a change-over will require only one hand.

Regulated air pressure is supplied from a compression and storage tank. The air is passed through a filter, and through a valve system to the turbines, which rotate at a maximum speed of 140,000 rpm. A gear system reduces the operating speed of the bur to a maximum of 50,000 rpm.

The bur speed is controlled manually by means of a spring on the outer casing of the handpiece. It can also be regulated by changing the air pressure by means of the reduction valve.

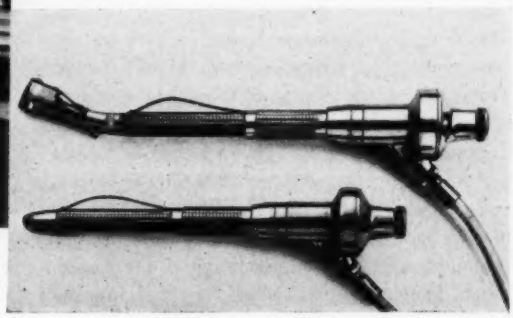
The expanding air cools the turbine and escapes at the back end. A fine stream of air is led toward the handpiece in order to cool it and help keep it free of debris during cutting.

The author has worked with the instrument daily for a year and has observed clinically that



Contra-angle and handpiece. Handpiece is separated from its motor and taken apart

Suspension unit with reduction valve, manometer, stopcocks and handpieces



much less heat is generated when combining rapid grinding with light pressure. More delicate control and less danger of slipping off the tooth is afforded because of the light working pressure.

Sturegatan 10, Stockholm Ö, Sweden

Methods for evaluation of rotating diamond-abrasive dental instruments

Jack L. Hartley, Donald C. Hudson, W. T. Sweeney and George Dickson. *J.A.D.A.* 54:637-644 May 1957

Examination of diamond instruments that had been discarded after clinical operative procedures showed that a breakdown of the bonding mediums, with resultant loss of the diamond abrasive, occurs in clinical use. The abrasive is lost at the relatively small area or points of the instrument which receive the greatest loading per unit area in use.

It was believed that an accelerated test, using a material such as glass, would determine the ability of a diamond instrument to retain its abrasive particles under the harsh conditions necessarily encountered in clinical use. An investigation of the use of glass as a test material for evaluating diamond abrasive instruments, therefore, was undertaken. Measurements were made on diamond cylindrical instruments cutting Pyrex rods and on diamond wheels cutting glass plates and tooth enamel. The following conclusions were reached:

1. The cutting ability of diamond instruments varies widely under the conditions of these experiments.

2. The more durable cylindrical instruments cutting Pyrex removed a greater amount of material as rotational speed was increased. The less durable cylinders demonstrated little or no improvement in performance at the higher speeds. The cutting rates of most of the ¼ inch diamond wheels were doubled in enamel and were more than doubled in window glass when the speed of rotation was increased from 5,000 to 10,000 rpm.

3. Close correlation of the relative cutting rates of diamond instruments in glass and enamel was not obtained under the conditions of the experiment. The breakdown which occurred in glass was not produced in up to 140 minutes of cutting in enamel. Those instruments that were outstanding in cutting glass were in most instances also outstanding in cutting enamel. The instruments poorest in cutting enamel were also relatively ineffective in glass. All instruments were erratic in behavior.

4. Breakdown of these instruments occurs under clinical use, possibly because of their small size which results in low peripheral speeds and high pressures on specific areas of the instruments. This breakdown is due to failure of the bonding medium with resultant loss of the diamond abrasive.

5. In the evaluation of the relative cutting effectiveness of diamond dental instruments, a test of the bonding medium should be included. It is believed that such a test can be based on cutting effectiveness in glass.

National Bureau of Standards, Washington, D.C.

▼ Equipment

Examiners' ratings of color transparencies of clinical signs associated with vitamin deficiencies

Susan B. Merrow, Mary M. Clayton, Chester A. Newhall and Walter D. Foster. *Am.J.Clin.Nutrit.* 5:56-61 Jan.-Feb. 1957

Kodachrome slides of 38 selected physical signs frequently associated with vitamin deficiencies were examined by seven physicians and one dentist, and independently rated according to written criteria. Forty-eight slides were used, including 12 of the eyes, 11 of the skin (limbs), 13 of the gingiva, 3 of the lips and 9 of the tongue.

The results showed significant differences between examiners. In order to differentiate between severity ratings of two-step intervals 85 times out of 100, the number of examiners needed to appraise each subject's color slide for a particular sign would be four or less for 30 of the 38 signs studied, the findings indicated.

Experience has shown that these slides provide a reasonably accurate clinical record of tissue. The slide provides for more objective evaluation of the tissue as it is dissociated from the subject. On the other hand, exact color reproduction offers some difficulties. The greatest advantage of color slides is that they provide actual pictures of tissue that can be observed by many examiners and compared with subsequent examinations of the same tissue in contrast to the written record or memory of the examiners.

Coreco Research Corp., 159 West Twenty-fifth Street, New York 1, N.Y.

Ultraviolet rays and diethylene glycol in the disinfection of the air in medical and dental offices

(Über die additive Wirkung von ultravioletten Strahlen und Triaethylglykol bei der Luftdesinfektion)

L. Grün. *Deut.med.Wschr.* 81:1217-1219 Aug. 3, 1956

At the Institute for Hygiene and Microbiology of the Medical Academy of Düsseldorf, Germany, the effect of ultraviolet irradiation used simultaneously with diethylene glycol aerosols in the disinfection of the air in medical or dental offices, operating rooms and hospital wards has been investigated.

Several medical and dental offices were infected artificially, and operating rooms and hospital wards were left in an unsterilized condition.

After irradiation with ultraviolet rays and the simultaneous use of aerosols filled with diethylene glycol, an immediate and significant reduction in the bacterial count in the air (from 79 per cent to 21 per cent) was established.

After the disinfection was repeated, again by using the same combination, only traces of bacterial spores and fungi remained in the air, in numbers too insignificant to cause infection.

The simultaneous use of both media in disinfection of the air can be recommended, especially to prevent cross infection and to eliminate treatment-resistant strains of staphylococci.

Several dentists and physicians have studied this technic carefully, and are using it in their offices. They report that ultraviolet irradiation combined with diethylene glycol, when properly used, offers an effective and inexpensive means to disinfect the air in offices and operating rooms.

Witzelstrasse 109, Düsseldorf, Germany

Sterilization in hot sand

(La esterilizacion en arena caliente)

Rodolfo Martinez Lavin. *Rev.A.D.Mexicana* 13:20-26 Jan.-Feb. 1956

From the viewpoint of pathology, sterilization is a process by which pathogenic organisms are destroyed by mechanical, physical or chemical means. Examples of mechanical means may be found in washing of the hands, the use of special garments, filtration of water and surgical drainage. Physical means include sunlight, ultraviolet rays, roentgen rays, and various other agents, but the only one in actual use is heat.

The application of a certain degree of heat for a certain length of time will destroy not only bacteria, but also their spores, which are their most resistant forms. Asepsis, which consists of therapeutic measures designed to protect the body against infectious organisms by destroying or eliminating them before they come in contact with it, is preferable to antisepsis, in which action is taken against organisms already present in the tissues. Aseptic measures, properly speaking, are applicable only to operative material and equipment, and not to living tissues.

Steam under pressure has greater penetrating power than boiling water or hot air; consequently, the autoclave is both the most efficient and the least time-consuming of the sterilizing apparatuses in which these substances are used. The primary example of sterilization by dry heat is the use of an open flame. Another method, used chiefly by dentists, is submersion in molten metal (50 per cent lead-tin alloy) with a fusion point of about 180° C., which sterilizes almost instantaneously (average time, 5 to 15 seconds), depending on the material to be sterilized.

A sterilizing apparatus recently placed on the market makes use of small crystal spheres as the source of the sterilizing heat. The author has modified this apparatus by substituting hot sand for

the crystal spheres, because bacterial tests have shown that the effectiveness of the sterilizer for a given time and temperature is inversely proportional to the diameter of the granules of which the sterilizing material is composed; that is, the smaller the granules, the greater their sterilizing ability. When the apparatus in question is so modified, it provides complete sterility at a temperature of 180° C. in a minimum of 5 seconds and a maximum of 15 seconds.

The cost of the electricity required to heat the sand is reduced by the heat-retaining properties of sand, which make it possible to maintain the desired temperature during an eight hour working day with only two hours of actual current consumption. The only disadvantages are that the number of instruments that can be sterilized at the same time is limited and that the apparatus obviously cannot be used for articles made of wax or rubber.

The author does not suggest substituting this method entirely for other standard methods of sterilization; rather, he presents it as a quick, convenient, auxiliary means of sterilizing dental instruments in daily use without injury or oxidation.

Via Carranza 93, San Luis Potosi, San Luis Potosi, Mexico

Recording of the functions of the masticatory muscles before dental restorations and speech therapy by the use of myotonometer and myograph
(Registrierung der Funktion der Kaumuskulatur in stomatologischer Beziehung und bei Sprachfehlern mit Myotonometer und Myograph)

E. Szirmai. *Deut.Stomat.* 7:85-88 Feb. 1957

Simple but reliable methods for measuring and recording the functional force of the masticatory muscles are valuable aids in evaluating the success of dental treatment and speech therapy.

At the Laboratory for Blood Coagulation and Muscular Activity of the University of Budapest, Hungary, the myotonometer and the myograph are used to record the muscular tonus and the effects of muscular contraction during masticatory function before dental restoration or speech therapy is attempted. Both instruments were modified and improved by the author and record accurately the functional force, and are easily and rapidly manipulated.

The myotonometer measures the myostatic contraction present, and the myograph draws diagrams of the phases and alterations (in time units) of muscular contractions during masticatory function.

To obtain a control, the number of masticatory movements is ascertained by visual counting as well as by the automatic instruments. The average number of masticatory movements and contractions usually is higher when registered by the instruments than when obtained by counting. The reason for such a difference probably lies in the fact that automatic instruments are able to detect, measure and record even the slightest and quickest movements of the mandible which can hardly be observed visually. The differences between the results of visual counting of those movements and those obtained by automatic recording with precision instruments sometimes are significant.

Without the use of these instruments, dentists and phoniatricians have to rely, more or less, on assumptions. The myotonometer and myograph permit the taking of measurements in all occlusal positions without limitation. Many problems arising in dental practice or speech correction can be solved, especially those in instances of abnormal biting, chewing or speaking habits which require corrective procedures.

In biophysical examinations in which myotonometer and myograph have been used, it was possible to determine and evaluate the direction, the relative and absolute amounts (the variations rather than the averages) of the forces exerted by (1) the superficial and deep parts of the masseter muscle; (2) the internal pterygoid muscle; (3) the external pterygoid muscle, and (4) the anterior and posterior parts of the temporal muscle.

At present, both the myotonometer and the myograph (in the author's modified and improved types) are used successfully at the dental clinics of the universities of Budapest and Debrecen, Hungary; Stockholm, Sweden; Bucharest, Romania; Hamburg, Germany, and Leningrad, U.S.S.R.

Madách Utca 8, Budapest 7, Hungary

▼

Therapeutics

Applicability of hyaluronidase preparation in dental practice

(Über die mögliche Verwendung der Hyaluronidasepräparate in der Zahnheilkunde)

K. Helbig. *Deut.Zahnärztebl.* 11:191-192 March 22, 1957

Hyaluronidase is the enzyme which hydrolyzes hyaluronic acid, the substance that acts as a physical barrier to the invasion of foreign materials. When hyaluronic acid is hydrolyzed, the tissue fluids are more easily diffused and more quickly absorbed. To accelerate diffusion and absorption of subcutaneously injected drugs, hyaluronidase is used to increase the absorption rate from 5 to 15 times that obtained by hypodermoclysis.

Hyaluronidase preparations have been used successfully in dental practice, and, with few exceptions, the patients have responded favorably.

Unfortunately, no international standard exists by which the effectiveness and the properties of the different commercial brands of hyaluronidase can be evaluated. The following hyaluronidase preparations are available: Apertase, Hyalase, Kinetin and Luronidase in Germany; Hyason in the Netherlands; Hyalase in England; Spredine in France; Sprase in Japan, Permease in Austria and Switzerland; Hialovistera and Ialovia in Italy and Spain; Hyalidase and Hialidase in Portugal; Hyalase in Denmark, and Alidase, Diffusin, Hyazyme, Infiltrate and Wydase in the United States.

In 1949, Looby and Kirby reported on the successful use of hyaluronidase in dentistry, mainly as an adjunct to local anesthetics. In 1951, Rosental described the improvement in local anesthesia obtained by adding hyaluronidase (Kinetin) to the anesthetic fluid, and also the biologic importance of relations existing between hyaluronidase and hyaluronic acid. Pöppel and Mankel reported on local and conduction anesthesia in the region of the jaws in which hyaluronidase (Kinetin) had been used as an adjunct.

Wild stated that hyaluronidase should not be added to procaine hydrochloride or epinephrine combinations because of increased toxic hazards.

Premedication with hyaluronidase when the pulp is to be devitalized increases the effect of arsenic. If pulpitis is present, hyaluronidase is contraindicated.

Reichenbach and others recommend premedication with hyaluronidase in cavity preparation, especially when a hypersensitive dentin is present.

Disturbances in the temporomandibular joint such as limited motion, jaw deviation, clicking and locking, mild subluxation, and pain from different causes have been treated successfully with hyaluronidase injections.

In tooth extractions, especially anterior teeth, hyaluronidase may be added to local anesthetics, or infiltrated when general anesthesia is required. Anesthesia will be more rapid in onset and longer in duration. Healing time will be reduced.

Traumatic swellings in the molar region (with trismus), in the cuspid region (with ecchymosis), in lower lips, in the region of the submaxillary glands and of the chin, have been treated successfully with hyaluronidase.

Evidence is available which indicates that hyaluronidase has its rightful place in dental practice.

Hallesche Strasse 23, Lutherstadt-Eisleben, Germany

The effect of tolazoline hydrochloride on tic douloureux

E. W. Poole. *Lancet* 272:805-806 April 20, 1957

It has long been recognized that attacks of tic douloureux may be suppressed by vasomotor agents such as choline derivatives, nicotinic acid, histamine and amyl nitrite. The action of more recent and possibly more effective vasodilator agents appears little explored; this report presents the results of an investigation of the effect of tolazoline hydrochloride on nine patients with severe tic douloureux. Two of the nine patients also had disseminated sclerosis and one an acoustic neuroma. Tolazoline hydrochloride was usually given first orally (12.5 mg.) as a test

for idiosyncrasy and in one patient this route alone was used. Graduated intravenous administration of up to 50 mg. in from 10 to 15 minutes was preferred.

Of eight patients given tolazoline hydrochloride intravenously, in six the attacks ceased dramatically and trigger areas became inactive for some hours. In the remaining two patients there was little definite change. In three responding and two resistant patients, further intravenous tests (after at least 48 hours) were made and gave similar results. Of the two patients showing no remission of the condition with intravenous therapy, one was subsequently found to have an acoustic neuroma and the other showed smaller peripheral vascular responses than usual. The final patient in the series was treated only orally and went into a remission for four months.

The results indicate that tolazoline hydrochloride may, like nicotinic acid, histamine and so forth, suppress the paroxysms of tic douloureux. The results in such a small series must be interpreted with caution, but it is evident that good temporary relief may be afforded.

United Oxford Hospitals, Oxford, England

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Miscellaneous

Recent research into disinfection and sterilization

(Zadatchi nautcho-issledovatelskoj raboty v oblasti desinfekzii)

V. I. Vashkov. *Zh.mikrobiol.,Moscow* 7:91-95 July 1956

Recent research has revealed that the commonly used organic mercurial compounds do not eliminate or destroy the spores of anaerobic bacteria.

Mercury in its various forms has been used in dentistry and medicine since the time of the early alchemist. Robert Koch, the German bacteriologist, made known its use as an effective antiseptic.

It has been claimed that the quaternary ammonium compounds in concentrations of 1:80,000 possess terminal bactericidal properties. Recent research, however, has established that these compounds are predominantly bacteriostatic, and are subject to the same limitations as are the various preparations of formaldehyde, mercury and phenol.

Sodium paratoluene sulfonchloramine (Chloramine T), a white crystalline powder, is freely soluble in water, ethanol, methanol and acetone. In solutions of from 0.1 to 4 per cent it can be used successfully as a bactericide and fungicide, and to fortify certain solutions used for instrument sterilization.

Resorcinol, a whitish crystalline diatomic phenol, is less toxic than other phenol compounds, and can be used as an antiseptic and germicide but it is less effective than creosote.

Recent research on resorcinol derivatives has established that their bactericidal effect can be intensified by increasing the carbon atoms from six to eight. Terminal sterilization then can be obtained even against the highly resistant *Staphylococcus pyogenes* var. *aureus*. Alkylresorcinol, another resorcinol derivative, possesses bacteriostatic and bactericidal properties against nonsporulating microorganisms.

For dental and medical practice, hexylresorcinol can be recommended. This antiseptic agent of the resorcinol group in solutions of from 0.1, 0.3 to 0.5 per cent has proved to be bactericidal for *Mycobacterium tuberculosis, Staphylococcus pyogenes* var. *aureus* and *Bacterium coli*.

As a physical disinfectant, ultraviolet or ultrasonic ray irradiation can be used in larger dental and medical offices or in hospitals.

It seems certain that in the near future comparatively new agents such as radioactive materials will be used for disinfection and sterilization.

Orthodontics and pedodontics

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Orthodontics

Alignment of a buried premolar

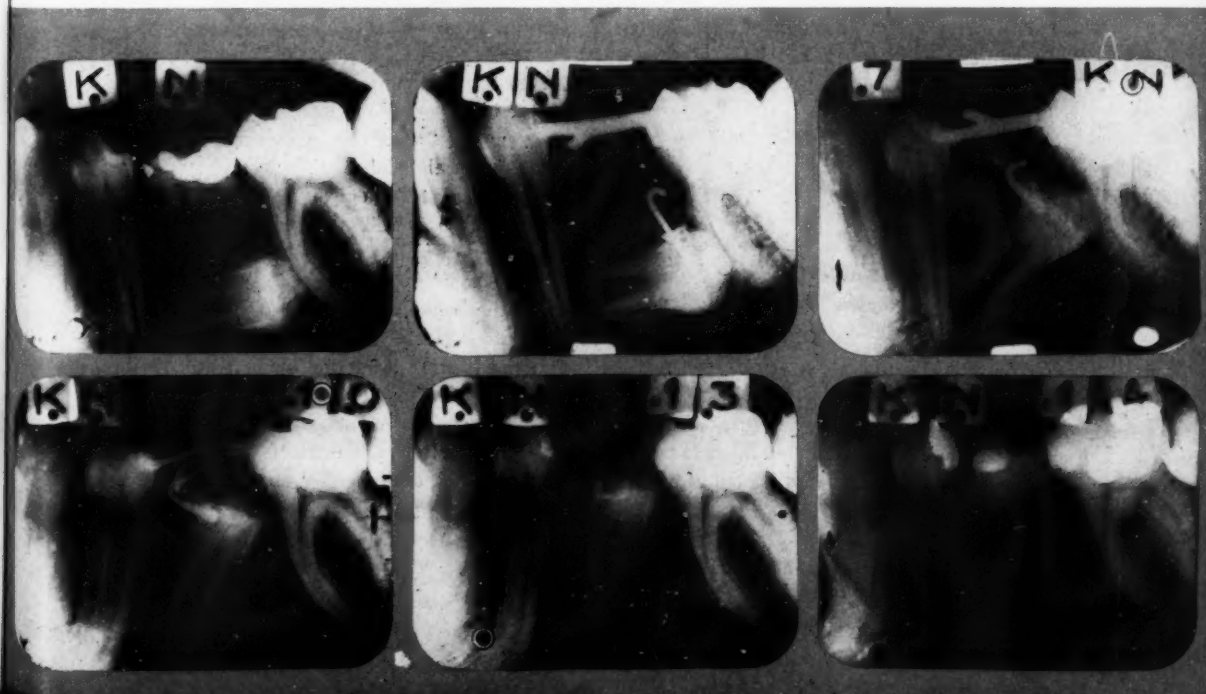
J. M. Robinson. *New Zealand D.J.* 53:26-28 Jan. 1957

Examination of a 14 year old boy revealed that all the usual teeth were present with the exception of the mandibular left second bicuspid, in place of which the second deciduous molar had been retained. A roentgenogram (illustration, above left) revealed the bicuspid impacted in a horizontal position with its crown lying distally against the root of the first molar. It was decided to attempt to bring the tooth into a normal position.

Casts of the lower jaw were made. With the assistance of a precision engineer, a bridge, machined out of stainless steel rod, was designed to fit into cavities to be prepared in the distal surface of the first bicuspid and in the mesial surface of an amalgam restoration in the first molar. Incorporated in the bridge was a small hook for the later attachment of a rubber ligature.

On May 9, 1955, the deciduous molar was extracted, the soft tissues retracted, and sufficient bone removed to gain access to the crown of the impacted tooth. In its uppermost or mesial surface a small cavity was prepared. A hook of 24 gauge stainless steel wire with its shank bent back double to aid retention was cemented into the cavity. Bleeding was controlled with a hemostatic alginate compound. A rubber ligature was attached to the hook, the wound packed with an antibiotic paste and the tissues sutured. The bridge was cemented into place (illustration, above center), and the rubber ligature hooked on to it. Healing was uneventful. The patient reported daily for the first week and thereafter at weekly intervals or whenever the rubber ligature needed renewing.

Roentgenograms were taken fortnightly to observe the movement of the tooth. After seven weeks, it was necessary to remove the bridge and reposition it with the hook uppermost in order to maintain tension on the rubber ligature. By October the bicuspid hook had come through the gingiva and was almost in contact with the bridge. The tissues were re-opened and the hook replaced with one having a shorter shank (illustration, above right).



By the end of November the appliance had become inactive. A new, rather fantastic appliance was fashioned from stainless steel wire, but it did not prove effective and was replaced some four weeks later. The next appliance consisted of a length of 24 gauge stainless steel wire bent double to fit between the bicuspid and the molar and act as a space retainer. From the end which was to be cemented into the molar a loop was fashioned to engage the hook in the second bicuspid (illustration, below left), and exert a force in a mesioocclusal direction.

In January 1956 the hook had come into contact with the distal surface of the first bicuspid; the appliance was removed and replaced in a cavity prepared in the occlusal surface of the second bicuspid. Further movement of the tooth was obtained until in March it was decided that there was nothing to hamper the tooth and that it could move the rest of the way without aid.

The apparatus was removed (illustration, below center). The cavities in the first bicuspid and the molar were filled with amalgam, and those in the second bicuspid with a temporary zinc-oxide cement.

The last roentgenogram (illustration, below right) was taken in May and showed the tooth in a normal position. There is evidence that the pulp has remained active insofar as root growth is concerned. The tooth is firm, comfortable, and in normal occlusion. Alveolar bone formation has kept pace with the movement of the tooth. It remains to be seen how much further development of the root there will be. Such as there is obviously will be slightly angulated to the long axis of the tooth.

Commercial Buildings, The Square, Palmerston North, New Zealand

Extraction in orthodontics
(La extracción en ortodoncia)

Costa del Rio. *Rev. soc. portuguesa estomat.* 63-78 July-Sept. 1956

All orthodontists recognize retention of all the teeth as an ideal to be sought, but they are powerless to attain it when the teeth are out of proportion to the jaws in which they are set. In such instances, the extraction of a tooth is neither a sacrifice nor a mutilation but a necessity.

The first essential, of course, is a conscientious diagnosis in each individual instance. This involves consideration of the field in which the work is to be done. In patients with hereditary tuberculosis or syphilis, the chances of orthodontic success are slight. If the patient has had severe rickets (symptoms will almost always be present to indicate the fact), the harder and more compact recalcification of the bone will make it more difficult to secure the necessary movement of the teeth. Other factors to be considered are the patient's structural type and also his family, because if his family cannot be counted on to cooperate, it may be better for the patient not to have a tooth extracted than to leave him with the correction only half finished.

Indications for extraction vary according to the stage of dental development. In the deciduous stage, or between the ages of three and seven years, anomalies in the relative position of the jaws, such as prognathism, overbite, and distoclusions of the width of a molar, may appear. Carried out at this time, the corrections are not only simple and certain to succeed, but they also eliminate the accompanying facial deformities, which in later years can be no more than disguised. Unless extensive caries makes it absolutely necessary, extractions should not be performed before the child reaches the age of seven; when they are unavoidable, retainers should be used to preserve the space between the teeth.

The transitional stage extends from the age of seven to the time the second molar erupts. This is the ideal period in which to correct anomalies in eruption, first of the incisors and later of the cuspids and the molars.

The third stage appears when the patient has reached the age of 12 years and all the permanent teeth, including the second molars, have erupted. This is the time when the orthodontist has to deal with the consequences of premature loss of the deciduous teeth, and of those lost because of proximal caries. Migration of the teeth resulting from the creation of vacant spaces leads to many types of malalignment, some of which can be corrected only by the extraction of teeth on one or both sides, and in either or both jaws, according to the requirements of the individual patient.

Furthermore, as the patient's age increases, it usually becomes even more necessary to resort to extraction because positional changes cannot be expected to take place in the bone after its growth has ceased. It would be a mistake, however, to suppose that the extraction of a tooth in order to secure a better alignment of those that are left invariably makes the correction easier; on the contrary, it imposes a greater obligation on the orthodontist, and it should never be resorted to unless every effort has first been made to secure the needed correction without the removal of sound teeth.

Avenida da Liberdade 65, Lisbon, Portugal

An appraisal of two relationships proposed for use in orthodontic diagnosis

Ernest H. Hixon and Howard V. Meredith. *Am.J.Orthodont.* 43:286-290 April 1957

Berger, in a paper presented at the 1955 meetings of the European Orthodontic Society, recommended wider use of two diagnostic aids which he has employed in clinical practice. One is the bizygomatic-bimolar relationship, the other a relationship between bizygomatic face width and width of the permanent maxillary incisors. Common to both is bizygomatic face width. One proposal recommends its use to determine the biologically correct width of the maxillary dental arch in the region of the permanent first molars. The other recommends its use to determine whether the maxillary base is adequate to carry the patient's mixed and permanent dentitions.

Both proposals were investigated on a sample of 100 white children, 47 boys and 53 girls, of northwest European ancestry, residing in or near Iowa City, Iowa. The dental impressions and bizygomatic measurements were taken within a few days of each child's eleventh birthday.

In terms of Berger's categories, the 100 maxillary dental arches were distributed as follows: "lack of space," 31; "harmony," 53, and "excess of space," 16. When the clinical adequacy of these classifications was tested against independent classifications made by Hixon from direct examination of the dental casts, it was determined that in 22 of the 100 maxillary dental arches there was insufficient space, and in ten there was some excess space. Of the 22 children lacking in adequate maxillary space, only eight fell within Berger's bizygomatic-incisor "zone of lack of space." Thirteen of the 22 were in his "harmony zone" and one was in the "zone of excess." Similarly, the ten arches orthodontically classed as having an excess of space were scattered across the bizygomatic-incisor zones (excess of space," five; "harmony," two, and "lack of space," three.)

In North American white children, it follows that the bizygomatic-incisor method advocated by Berger falls far short of qualifying as an "extremely sensitive" diagnostic tool for determining the "maxillary base." Of the 22 dental arches found by orthodontic examination to show lack of space, less than 40 per cent were so classed by the bizygomatic-incisor relation, and of the 31 dental arches selected as having lack of space by the bizygomatic-incisor relation, less than 30 per cent gave evidence of lack of space on orthodontic examination.

State University of Iowa, Iowa City, Iowa

A comparison between the Frankfort horizontal and the sella turcica-nasion as reference planes in cephalometric analysis

Rolf Bjerin. *Acta odont.scandinav.* 15:1-12 March 1957

A study was undertaken to determine the mean value of the angle between the horizontal plane and the Frankfort horizontal plane and the sella turcica-nasion plane. Measurements were made on 11 women and 24 men in both standing and sitting positions. All the subjects were students at the Royal School of Dentistry in Stockholm.

The mean deviation between the Frankfort and the true horizontal planes for the standing position was +1.8 degrees, and the corresponding angle between the sella turcica-nasion and the true horizontal plane was —4.3 degrees. The values for the sitting position were +0.1 and —6.2 degrees, respectively.

The variation between the Frankfort and the true horizontal planes ranged from +15.3 to

—11.7 degrees (standing) and from +13.0 to —13.8 degrees (sitting). For the angle between the sella turcica-nasion and the true horizontal planes, the ranges of variation were from +7.7 to —16.3 degrees (standing) and from +7.0 to —19.4 degrees (sitting). Such ranges indicate the advisability of taking into account in profile analysis the biologic variation of the base.

The standard deviations of the Frankfort horizontal variation in relation to the true horizontal were 4.6 and 4.3 degrees in the standing and sitting positions, respectively; for the sella turcica-nasion plane the corresponding values were 4.0 and 4.4 degrees.

This variation was found to be but to a small degree dependent on the uncertainty in setting the head in a natural horizontal position.

Royal School of Dentistry, Stockholm, Sweden

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Growth and development

Serial dental casts of Australian aboriginal children

M. J. Barrett. *Australian D.J.* 2:74 April 1957

Since August 1951, staff members of the Dental School of the University of Adelaide have visited Yuendumu Native Settlement, Central Australia, and have obtained 333 sets of plaster casts of the dental arches of full-blooded Australian aborigines.

A striking feature is the regularity of the dental arches of the natives and the almost complete freedom from gross malocclusion and dental diseases so commonly seen in children of civilized communities. Other features of general interest are their large teeth in capacious jaws, full-term retention of deciduous teeth until exfoliation, regular occurrence of occlusal and interproximal abrasion, early eruption in sequence of permanent second molars and the tardy eruption of second bicuspids.

Dental School, University of Adelaide, Frome Road, Australia

A cephalometric study of the growth of the soft palate

J. Daniel Subtelny. *Plast.& Reconstr.Surg.* 19:49-62 Jan. 1957

Serial cephalometric roentgenograms obtained from the files of The Charles Bingham Bolton Study of the Face of the Growing Child at Western Reserve University on 30 male and female subjects with roentgenographic records from infancy to early adulthood were evaluated.

The average growth in length of the soft palate is most rapid during the early years of life. After about one and a half to two years of age, the mean growth curve levels off, and resumes its upward trend after four to five years of life.

The angle formed by the soft and hard palates becomes progressively more acute with age.

These observations apply to the diagnosis, prognosis and therapy in children with cleft palates. It has been reported that a surgically repaired soft palate grows more slowly than the surrounding soft tissue, although material has not been presented to substantiate this contention conclusively. In the light of this possibility, however, it is inadvisable to repair a soft palate surgically prior to one and a half to two years of age. This appears to be the period of most rapid growth for the normal soft palate. Any disturbance or any diminution in the velar blood supply at a time of rapid growth would seem to be undesirable. Slaughter and Pruzansky (1954), however, reported a case history in which the soft palate continued to increase in length after the early surgical closure of the velar cleft.

The theory that it is advisable to wait until about five years of age before surgically correcting a cleft palate does not seem routinely desirable in view of the present observations. Generally, the period from the second to the fourth year seems to be a latent period in velar growth. It seems unwise to postpone surgery during a normal period of slow or little growth and then to perform it when the velar growth is active.

The dimensions of the nasopharyngeal space change longitudinally as a function of growth. There is a progressive increase in the height and depth of the nasopharynx as a result of growth.

Eastman Dental Dispensary, Rochester, N.Y.

Operative dentistry

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Inlays and fillings

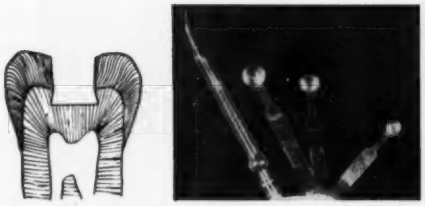

Figure 1 Left: Preparation of cavity in a human molar for a self-curing acrylic filling. Right: Instruments used for inserting "Palavit 55," a self-curing acrylic filling

Self-curing acrylic resins as filling material (Die Kunststoffüllung)

Josef Kluczka. *Deut.Zahnärzte Kal.* 16:146-162, 1957

The materials produced today for direct acrylic fillings, especially in molars, are radically different from materials manufactured for acrylic restorations in which predominantly coarse polymers or fine mesh powder and the usual monomer are used.

The cavity preparation for self-curing fillings does not differ greatly from that described by Black, and the same armamentarium can be used.

Reaction, porosity, degree of swelling during water absorption, hardness and marginal stability of the filling materials are as important as their permeability to staining and bacteria. The main problem, however, lies in the color stability, the ability to withstand the marginal fiber stress, and the influence on the pulp of the materials used.

Earlier acrylic products often discolored the tooth structures; however, recently introduced brands, when mixed and processed properly, are comparatively free from this defect. Occasional endogenous discoloration caused by chemical alteration of some of the ingredients during polymerization must be differentiated from the exogenic discoloration which is caused by the adverse reaction of the oral tissues to the synthetic materials.

In a study made at the Dental Clinic of the University of Mainz, Germany, to evaluate the

Figure 2 Third molar of a 25 year old man, extracted one month after insertion of a self-curing acrylic filling without protection of the pulp. Hyperemia occurred in the pulp region, probably reversible

Figure 3 Pulp of the molar of a dog, extracted one month after insertion of a self-curing acrylic filling. A phosphate cement lining protected the pulp. Odontoblasts were not damaged, blood vessels were dilated and severe hemorrhage was present. Reversible alterations in the pulp were present

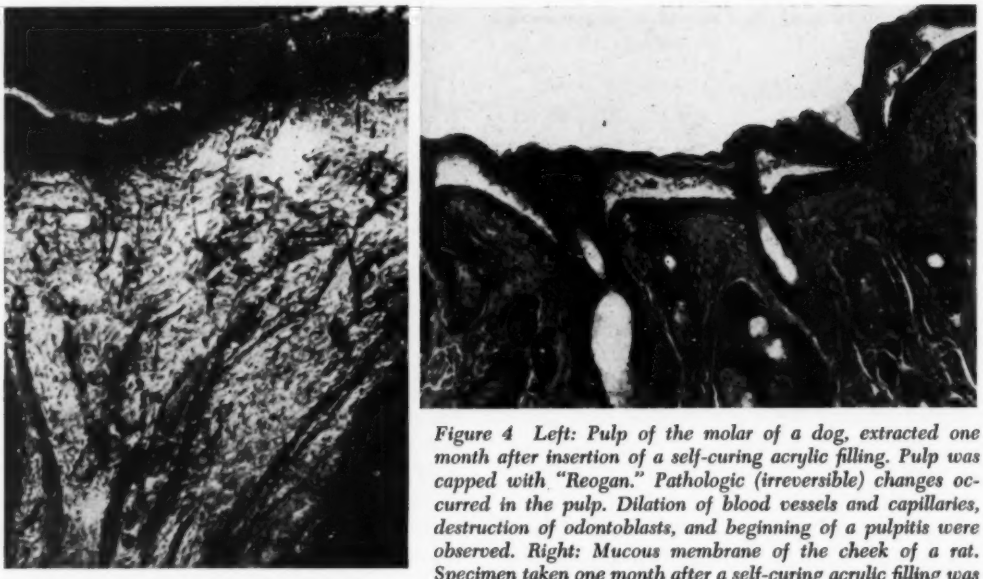

Figure 4 Left: Pulp of the molar of a dog, extracted one month after insertion of a self-curing acrylic filling. Pulp was capped with "Reogan." Pathologic (irreversible) changes occurred in the pulp. Dilation of blood vessels and capillaries, destruction of odontoblasts, and beginning of a pulpitis were observed. Right: Mucous membrane of the cheek of a rat. Specimen taken one month after a self-curing acrylic filling was inserted in the rat's third molar. Detachment of the epithelial layers of the mucosa was caused by an exudate formation. Dilation of blood vessels and capillaries, and widespread infiltration of leukocytes were seen, also breakdown of the muciparous glands

applicability of self-curing acrylic resins as a filling material, the new German brands "Palavit 55" and "Sevriton" were irradiated for several hours with ultraviolet rays. The tendency to discoloration was negligible if the materials were not brought into contact with volatile oils, thymol, iodoform or phenol derivates.

After polymerization, fillings made of self-curing acrylic resins can be affected by chloroform, ether, xylene, ethyl alcohol or other chemicals.

The consequences of an inadequate marginal closure are often severe. This defect, inherent in all synthetic fillings, is not eliminated when Palavit 55 and Sevriton are used. Contraction and shrinkage of these materials often result in leaky margins which expose the dentin to the oral environment and cause pulpal irritation. This imperfection, occurring in both filling materials tested, may be overcome by an especially careful cavity preparation and by inserting the material in bulk into the cavity and keeping it under pressure until complete hardening occurs.

The most important factor in evaluating self-curing acrylic resins as filling materials is their relation to the vitality of the pulp. In isolated instances, a toxic effect on the pulp has been observed. Irritation of the pulp occurred; damage, sometimes reversible, but frequently irreversible, was observed. Irreversible damage consisted of dilation of blood vessels, diffusion stasis, diapedesis and hemorrhage.

In animal experiments, ruptures of vessels, diffusion of leukocytes and destruction of odontoblasts have been established. In isolated instances, a complete necrosis of the pulp occurred. The investigations at the clinic also included clinical and histologic examinations of tooth specimens from human and dog teeth (450 human and 88 dog teeth), in which acrylic resins had been used as filling material. In 14 instances, severe damage to the pulp, and in nine, necrosis, had occurred. The fillings with self-curing acrylic resins had been inserted without special protection to the pulp. Trauma, subsequently observed, could have been caused not only by the adverse effect of the material on the pulp but also by reaction to the drilling or the extraction.

The monomeric methacrylic acid methyl ester seems to be most damaging to the pulp. No damage to the gingiva was observed.

Although the preliminary investigation of the biologic properties of self-curing acrylic resins used as filling materials produced no conclusive results, it seems practical at the present time to consider this filling material as in the experimental stage, even though reports of satisfactory service, especially when used in molars, have appeared in European dental literature.

If further studies should prove that some brands of self-curing acrylic resin can be used successfully as filling materials, then it will be time to recommend these products for use in operative dentistry.

Saarstrasse 21, Mainz, Germany

Development and evaluation of varnish type cavity lining materials

Michael Buonocore. *Internat.A.D.Res. Preprinted Abst.* 117 March 21, 1957

Because of the adverse pulpal effects of acrylic resin restorations and the increased use of silicates, research was initiated to develop a varnish-type cavity lining material which would be easier to use and would afford greater protection to the pulp than the cement bases and cavity varnishes presently used. Although zinc phosphate cements are used routinely as liners, they often are hard to handle and are poor esthetically. With cavity preparations in deciduous or young anterior permanent teeth, bases are almost a necessity, yet lack of space makes insertion difficult. Cements cannot be used to line enamel cavity walls; therefore, this region is subject to carious attack, particularly when filled with acrylic resins where large dimensional changes allow oral debris to percolate.

For this investigation a wide variety of organic film-forming substances was screened. Films from equal quantities of 2 per cent solutions of the substances were plated on equal areas of enamel and dentinal surfaces, and evaluated for ease of application, serviceability in a short time, resistance to penetration by acids and ions, resistance to destruction in a saliva-glucose fermentation environment, and moisture-resistant adhesion to dentin and enamel.

Test results show that the available dental varnishes perform poorly. Several industrial coating solutions appear to have desirable properties for use as liners. Acrylic resins dissolve most of the lining materials, thus destroying their protective effect. Certain epoxy resin-based films when modified by isocyanates appear to be superior to available liners.

Eastman Dental Dispensary, Rochester, N.Y.

Reaction of gingival tissues to self-curing acrylic restorations

Jens Waerhaug and H. A. Zander. *J.A.D.A.* 54:760-768 June 1957

Self-curing acrylic restorations, reaching below the gingival margin to the bottom of the clinical pocket, were placed in 23 teeth of dogs and monkeys. The observation period varied between 13 and 338 days, after which the animals were sacrificed and the tissues studied histologically. The technic of dissolving the acrylic resin in chloroform before sectioning preserved the soft tissue in relation to the resin in the same way as acid decalcification preserves it in relation to the enamel. Study of the histological sections indicated the following:

1. A self-curing acrylic restoration produces a chronic inflammatory reaction in the adjacent gingival cuff.

2. A crevice exists between the acrylic restoration and the tooth cavity. This crevice is filled with plaque, necrotic material or epithelium.

3. A plaquelike material is found frequently on the surface of the acrylic filling and in contact with the pocket epithelium.

4. These conditions may lead to a deepening of the clinical periodontal pocket.

Institute of Dental Research, Josefinegaten 32, Oslo, Norway

Periodontics and endodontics

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Endodontics

Root canal treatment of molars

(Befürwortende Stellungnahme zur Wurzelbehandlung auch an Molaren)

L. Castagnola and J. Alban. *Deut.Zahnärztebl.* 10:777-781 Oct. 22, 1956

The proponents of the hypothesis that dental focal infection induces systemic diseases refuse to acknowledge the possibility or advisability of the conservation of nonvital teeth, especially of molars. The sacrifice of numerous teeth did not bring the expected cure or improvement of systemic diseases, and, therefore, interest in treating and conserving nonvital teeth increased again in dentistry.

The existing trend to extract all afflicted molars is hard to understand, especially if practiced in countries in which the classical methods of root canal treatment have been developed and refined. Among these countries are Germany (Walkhoff) and Switzerland (W. Hess and O. Müller).

As an answer to the objections made against the root canal treatment, several successful instances are reported and the accompanying roentgenograms unquestionably prove the successful results of endodontic treatment of molars.

The results of tests, published repeatedly in dental literature, which seem to prove that dental foci promote or influence the development of systemic diseases have been declared invalid by many outstanding bacteriologists, most recently by Grumbach at the Congress of the F.D.I. in Zurich (1956).

The value of a medical diagnosis of dental focal infection and its assumed influence on gen-

Figure 1 Right second bicuspid and first molar after pulp extirpation and endodontic treatment

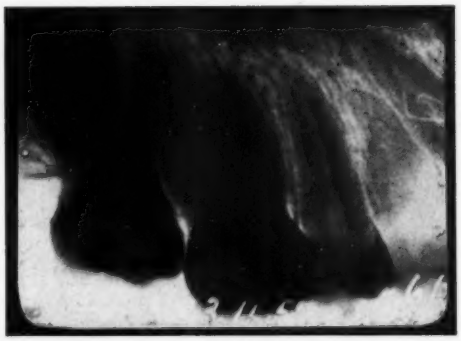

Figure 2 Molar after endodontic treatment. Unusually long roots

Figure 3 Granuloma and fistula. Filling material emerges at the orifice of the fistula

Figure 4 Circumscribed granuloma at the distal root. Left: Before treatment. Center: During treatment. Right: Nine months after treatment

eral diseases is uncertain. For example, Bakwin reported that among 1,000 American children in whom dental focal infection was present, one medical specialist indicated that 610 required immediate tonsillectomy. Another specialist found similar indications in 500, and a third in 390.

Unfortunately, the dentist's treatment plan sometimes is influenced by financial considerations. Dentists should require from the physician who demands radical tooth extraction to eliminate foci of infection, a declaration of responsibility for all consequences of the (unnecessary) extractions. Such a declaration should always be requested when physicians order tooth extractions in opposition to the dentist's judgment.

The replacement of unnecessarily extracted teeth with prosthetic appliances is comparatively expensive and sometimes injurious to the patient, especially if partial dentures with clasps are inserted.

The value of conserving molars whenever possible is demonstrated by the great effort most dentists make to preserve these teeth.

Patients and dentists should be ready to accept endodontic treatment of molars as a proper conservative procedure.

For no reason, financial or otherwise, should dentists be willing to extract molars which can be saved.

After the prefilling phases of endodontic treatment have been completed, and the molar is prepared to receive the filling, silver points are fitted into the root canals. These silver points, previously sterilized, must be kept sterile by immersion in a germicidal solution. Throughout the treatment, these points must be regarded as sterile implements and, therefore be resterilized to insure the maintenance of asepsis.

The final success of root canal fillings in molars depends on the proper selection, adjustment and adaptation of the silver wires used. Each wire should extend to the apex and fit snugly. A paper point is inserted in each root canal which then is double sealed.

Dentists should consider endodontic treatment of molars as an improvement of conservative health service.

Bahnhofstrasse 39, Zurich, Switzerland

Protection of healthy and inflamed pulps with calcium hydroxide, after partial pulpectomy (Protección con hidróxido de calcio de pulpas sanas e inflamadas, posteriormente a la pulpectomía parcial)

Rómulo L. Cabrini, Oscar A. Maisto and Eduardo E. Manfredi. *Rev. A. Odont. Argentina* 44:446-454 Nov. 1956

It is important to be able to establish the degree of pulp inflammation that will permit a successful partial pulpectomy with calcium hydroxide protection.

In patients between 16 and 27 years old, partial pulpectomies were performed on 35 teeth after careful clinical diagnosis of the pulp condition. Coronal pulp was extirpated under a rubber dam with strict aseptic conditions. Radicular stumps

were covered with a thick paste of calcium hydroxide in distilled sterile water.

All teeth were extracted, decalcified and stained. Calcification was visible after 30 days of calcium hydroxide application, and a completely calcified barrier appeared in 67 per cent of the teeth after 90 days.

Such a high percentage of successful calcification in instances of evident pulpitis indicates that this would be correct treatment.

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Technics for public health endodontics: reintroduction of an old and simple method
(Técnicas para endodoncia social: reivindicación de un viejo y simple método)

F. M. Pucci and F. Pucci, Jr. *Odont.Uruguaya* 10:147-150 July-Aug. 1956

Root canal therapy is not performed in public health dental polyclinics. The procedure is considered time consuming and of uncertain satisfactory results. Any tooth with pathologic involvement of the pulp or even with a doubtful diagnosis of caries penetrating into the dentin is systematically extracted. Three methods of public health endodontics for groups are proposed:

1. Conservative treatment with preservation of the pulp or intrachamber pulpotomy with preservation of the bulbar pulp fibers is indicated in the treatment of teeth with deep dental caries in which the pulp is only moderately involved. The pulp or its fibers and deep dentin are kept in contact with calcium hydroxide. The results are checked some time after the treatment.

2. Root canal therapy followed by immediate obturation of the root canals is indicated, provided the diagnosis indicates that the radicular pulp is vital, in the treatment of teeth with exposure of vital pulp. The operation is made using few instruments, is performed in a short time and can be completed in one visit.

3. Howe's modified method of silver impregnation is the ideal procedure for the treatment of teeth with infected root canals. Howe's modified technic has all the advantages and none of the disadvantages of the original technic. Indispensable preoperative and operative requirements consist of a clinical and roentgenographic diagnosis, aseptic technic in all the stages of the operation by using a rubber dam, a study of the anatomy of the pulp chamber and of the root canals, cleaning of the root canals of putrid matter, enlarging the lumen of the canals and washing and drying the root canals. A solution of nitrate of ammoniacal silver precipitated by eugenol is used for impregnation.

Precautions are the following:

1. The walls of the pulp chamber and of the cervical third of the root canals are covered with varnish or with any resinous solution or with melted wax. (Care is taken not to obstruct the root canals during the varnishing.)

2. The nitrate of ammoniacal silver solution should be freshly prepared.

3. Contact of the silver solution with sodium chloride solution should be prevented. (Reaction between solutions results in the formation of nonsoluble, heavy silver chloride, which antagonizes impregnation.)

4. The silver nitrate solution should not be used in the presence of water, blood, blood serum or serum albumin, all of which prevent impregnation.

5. Arsenical preparations should not be used in root canals when silver impregnation is to be carried out. If an arsenical preparation previously was used, it should be removed thoroughly from the root canal by repeated lavage and dehydration of the canal with alcohol.

6. The silver solution should not be forced into the root canals. Cautious application of the solution prevents acute periapical pain which follows the forced injection of the solution. The infiltration and precipitation of the substance into the root canal and the dentinal walls is facilitated by the use of fine instruments after the solution has been applied.

7. The instruments which are used in Howe's original technic should be used for this modified technic.

8. The environment of the surgical field should be alkalized by using a chloramine solution.

9. The obturation of the root canal after impregnation is obtained by the use of a creamy paste prepared with zinc oxide, eugenol and thymol. (The obturation is completed by using a short cone of gutta-percha. Obturation of the

apical segment of the root canals occurs during precipitation of metallic silver.)

Howe's modified technic is simple, quick and efficient. Silver impregnation is carried out in a nine minute session in three successive applications during which the silver solution is changed every three minutes. This is followed by the application of eugenol solution for three minutes. Satisfactory sterilization and obturation of the root canals by silver impregnation is secured in not more than 20 minutes after the root canals have been superficially prepared. The operation can be made in one session unless postoperative complications are feared or not enough time is available. In either instance the operation is completed in a second session.

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Periodontics

Mobility of the teeth as a check of periodontal therapy

(Om parodontoterapi och tandrörlighet)

A. Forsberg and G. Hägglund.

Svensk tandläk.Tskr. 50:67-78 Feb. 1957

A series of pathologic symptoms have been observed in patients with chronic marginal periodontitis. The authors have used the mobility of the teeth as a measure of the course of the disease, as this is the symptom that can be measured most accurately. The mobility was measured on the upper incisors only. A pressure of 600 Gm. was applied in a lingual as well as in a labial direction.

Four groups of patients at the Royal School of Dentistry, Stockholm, were studied. None of the patients had been treated previously; the degree of mobility could in all instances be shown with usual clinical methods, but was never so great as to indicate extraction as the only desirable therapy.

Group 1: Eleven patients were left untreated. Measurements were taken on 38 teeth over an average of 51 days. After this time 18 teeth showed increased mobility, 18 showed decreased mobility whereas two teeth showed no change.

Group 2: Eight patients were given ultrasonic treatments of less than ten minutes' duration every second day for three weeks. Because of recent magazine publicity, there was great interest among the public for this form of therapy and several patients asked for this treatment. Thirty-one incisors were measured. After the three weeks, 11 teeth showed less mobility, 16 greater and 4 were unchanged; thus no therapeutic effect was proved.

Group 3: Twelve patients started performing gingival massage at home three times a day; of these six stopped the massaging, however, as the pain and bleeding resulting from the treatment made them suspect that the massage would aggravate the condition. The remaining six patients continued the massage for three weeks. Measurements showed that of 24 teeth, 23 were more firmly attached and only one tooth had increased mobility. The results must be regarded with some reservation, however, as half the original patients in this group defected.

Group 4: Nine patients in this group were treated by surgery, three the so-called "flap operation" and six gingivectomy. In all patients the field of operation was covered with a surgical pack without previous sutures. Sprays and a mild cauterizing with 10 per cent zinc chloride were the only postoperative treatments. An increase in mobility was found soon after the operation in almost all patients. This initial increase was followed by a decrease in mobility, but the end result rarely constituted an improvement over the condition prior to the operation. One reason is that it is difficult to avoid the accidental removal of some of the periodontal fibers during the operation.

In an additional two patients more than one type of therapy was used. In one instance massage of the gingiva was practiced for three weeks, starting 60 days after surgery had been performed. An improved fixation could be noted. In the second instance a combination of surgery and grinding was tried. A temporary improvement was obtained. Great care should be taken, however, in using selective grinding or extractions in order to correct load conditions.

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Preventive and public health dentistry

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Caries etiology and control

Fluoridation of drinking water, a caries-preventive measure
(Fluorováni pitné v prevenci zubního kazu)

Č. Parma. *Časop.lék.česk.* 46:401-405
March 29, 1957

International research (especially American and Russian) already has obtained unquestionable evidence that a definite relation exists between the fluoride content of drinking water regularly consumed and the resistance to dental caries in children that were previously caries-susceptible.

Czechoslovakian research has established that today caries is the most frequently occurring human disease in this country. The utilization of fluoride as a caries-preventive procedure which by internal application lowers the disposition to cavity formation to such an extent that the incidence of caries is reduced by about 50 per cent, therefore, appears to be a "must" for the Czechoslovakian public health authorities.

The most practical and beneficial use of fluoride is in regularly consumed drinking water. At present, more than 35,000,000 people in different countries consume drinking water which had been artificially enriched with fluoride. The addition of the recommended 1 ppm fluoride to drinking water would present no major problem in Czechoslovakia.

The dental and medical associations of Czechoslovakia should advise the public health authorities that the administration and control of the fluoridation program can be achieved without serious difficulty, that its benefit for dental health without impairment of the general health has been established by national and international research, and that all other proposed alternative procedures such as adding fluoride to table salt, tooth pastes, mouthwashes, chewing gum, milk or bottled water as well as the medication of fluoridated tablets, still are not adequately tested and provide enormous control difficulties. As yet, these inadequate procedures cannot be recommended.

Statistics on the preventive effect of fluoridation of drinking water, however, have provided sufficient proof that the caries incidence was greatly reduced in all countries and communities where fluoridation has been in general use. These statistics have appeared in dental and medical literature of many countries, and are available in Czechoslovakian scientific libraries.

After studying these reports and statistics, the conclusion can be reached that fluoridation of drinking water as the only effective caries-preventive procedure, at least as a large-scale experiment, should be introduced immediately in Czechoslovakia.

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The yeast flora of dental caries: a quantitative and qualitative investigation in a group of Europeans and non-Europeans in South Africa

J. F. Van Reenen. *J.D.A.South Africa* 12:39-42
Feb. 1957

Four hundred carious teeth, 200 from Europeans and 200 from non-Europeans, were investigated for the presence of yeasts. Only 56.5 per cent of the teeth from Europeans and 38.5 per cent of the teeth from non-Europeans were positive for yeasts. In the case of *Candida albicans* and *Torulopsis glabrata*, this difference is attributed to a racial factor, and in the case of all other yeast species, to dietary factors.

The following 16 yeast species were isolated: *Candida albicans, C. krusei, C. tropicalis, C. utilis, C. guilliermondi, C. mycoderma,* and *C. pseudotropicalis; Saccharomyces cerevisiae, S. willianus, S. carlsbergensis,* and *S. tellustris;* and *Rhodotorula mucilaginosa, R. texensis, Torulopsis glabrata, Sporobyolomyces salmonicolor* and *Cryptococcus lauerentii.*

Candida albicans was present in 93 teeth of the Europeans and 43 teeth of the non-Europeans investigated. *Saccharomyces cerevisiae* was isolated in 6 teeth from Europeans and 24 teeth from non-Europeans, and *Torulopsis glabrata* in

3 teeth of Europeans and 11 teeth of non-Europeans.

According to the chemicoparasitic theory, caries is initiated by acid decalcification of the tooth substance. Yeasts cannot produce sufficient quantities of acid for this decalcification. Therefore, yeasts cannot initiate dental caries according to this theory, and are secondary invaders of the carious lesions. The symbiotic action of yeasts and lactic acid bacteria, however, gives rise to larger quantities of acid than produced by the lactic acid bacteria alone (Fosdick and others, 1936, 1937 and 1940). In this way yeasts may accelerate the carious process.

It may be concluded that yeasts accelerate the carious process by providing growth factors for other microorganisms, that their incidence in dental caries is not high enough to be either essential or important in the carious destruction of teeth, and that, except for *C. albicans* which is a potential pathogen, all yeast species found in this survey are of no individual importance.

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Fluoride-placental transfer in the rat

Gertrud Buttner and Joseph C. Muhler. *Internat. A.D.Res. Preprinted Abs.* 6 March 21, 1957

Fourteen pairs of adult rats were used for continuous breeding. Six groups received varying fluorine concentrations in the drinking water of 1, 3, 5, 10, 25 and 50 ppm fluorine as sodium fluoride. A control group received distilled water.

After delivery, two pups of each litter were sacrificed at birth, two at ten days and two at 30 days. The whole carcasses were ashed in order to determine the fluorine content. The data obtained by analyzing the animals sacrificed at birth suggest that about 10 ppm fluoride must be received by the mother rat before any appreciable increase in carcass fluoride is found in the pups. At the highest fluoride level used, that is, 50 ppm, about twice as much fluoride was found in the whole carcass of the pups whose mother received fluoride as when no fluoride was given the mother.

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Experimental dental caries and hormones: a historical review

Em. Stelling and Gösta Gustafson. *Odont.Revy* 7:354-368 No. 3 1956

A review of the results of experiments on the relationship between dental caries and hormones leads to the conclusion that more searching and extensive investigations of this subject are required. It seems likely that the endocrine glands do have some influence on the development of dental caries. Little is known, however, of the way in which this influence is exerted. Experiments of this kind are difficult to carry out and, as even the normal functions of the endocrine system are only incompletely established, experimental interference with these functions may involve so many unknown factors that the interpretation of the results becomes difficult.

Another difficult problem in the experimental investigation of dental caries is the minimum number of animals which should be included in each group to allow definite conclusions to be drawn. Fairly large numbers are necessary; Gustafson and others (1952) found this number to be between 25 and 30 in their hamster studies. Many experiments have had insufficient numbers of animals to support the conclusions drawn.

A cautious interpretation of the present state of experimental work may be summarized as follows:

1. Gonadectomy seems to reduce the incidence of dental caries, the effect of castration being more pronounced than that of ovariectomy.

2. The effect of the administration of male sex hormones is doubtful. Estrogens, however, given to either male or female animals, increase the caries incidence.

3. The salivary glands, especially the submaxillary gland, are altered in histologic structure and secretion both in quality and quantity under the influence of the endocrine system.

4. The thyroid gland seems to play a role. The administration of desiccated thyroid reduces the caries incidence and this effect is more pronounced when the desiccated thyroid is combined with testosterone or sodium fluoride. Thiouracil, a thiourea derivative which affects adversely the

synthesis of the thyroid hormone, increases the incidence of caries.

5. The single experiment with hypophysectomy reported here resulted in an increase in caries incidence after the operation.

6. Experiments with alloxan diabetes have shown conflicting results with greatly increased caries incidence in one experiment and no difference from the controls in the other.

7. The relation of the endocrine glands to dental caries has recently become of more practical interest through the fluoridation of municipal water supplies with its possible effect on thyroid function.

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Determination of hydroxyapatite layer formation on tooth surfaces caused by fluoride ions after use of radioactive phosphate

(Nachweis der durch Fluor-Ionen gesteigerte Hydroxylapatit-Deckschichtenbildung auf Zahnoberflächen mit radioaktivem Phosphat)

Adolf Knappwost. *Naturwissensch.* 43:477 Oct. 15, 1956

It has been reported that in a caries resistant dentition, an artificially corroded heterogeneous enamel surface, which consists of hydroxyapatite and a small quantity of keratin, can be restored quickly by a homogeneous hydroxyapatite layer. The modern physiochemical theory (resistance theory in caries) considers the fluctuation between the decomposing influences and the reparatory capacity of the saliva as the most significant factor in caries development. According to this theory, progressive caries on certain parts of the tooth occurs if the speed of the decomposition (V_k) is greater than the speed of the reparatory activity in the layer formation (V_d).

The ratio of V_d and V_k depends on the viscosity (η, that is, eta) of the saliva in its resting state. The viscosity is related to the thermodynamics and the kinetics of the formation of covering strata in the following manner: (1) as the value of η decreases, the pH of the saliva increases, and (2) the reparatory speed in the layer formation (V_d) of the hard substances of the tooth depends on the volume and the viscosity of the saliva adhering to tooth surfaces.

This condition originates according to the laws of diffusion. The relationship can be stated by the formula: $V_d = \text{constant} \times \eta^{-3/2}$.

After a peroral administration of magnesium fluoride, the localized exchange of ions occurs in the following manner:

$$Ca_{10}(PO_4)_6(OH)_2 + F^- \rightleftarrows Ca_{10}(PO_4)_6(OH,F) + OH^-.$$

This reaction leads to the formation of a difficultly soluble fluor-hydroxyapatite, but plays only a minor part in caries development or prevention.

The Ca++ and the $PO_4\equiv$ concentrations in the saliva are scarcely altered by the fluoride. It can be assumed that magnesium fluoride exerts a strong influence on the viscosity (η) of the saliva and consequently of its self-reparatory activity in the layer formation (V_d).

To test this theory, each of 21 six-week-old Syrian golden hamsters (Group 1) received orally 0.04 mg. of magnesium fluoride daily for two months. Twenty-one golden hamsters of the same strain and age were used as controls (Group 2).

On the fifty-sixth day, both groups of animals were given a subcutaneous injection of 0.054 mC of P^{32} as phosphate.

Four days after injection, the counts in five minutes determined with the Geiger counter were as follows: (1) Group 1, females, lower jaws, 1,644; (2) Group 2, females, lower jaws, 902; (3) Group 1, females, upper jaws, 844; (4) Group 2, females, upper jaws, 552; (5) Group 1, males, lower jaws, 1,724; (6) Group 2, males, lower jaws, 622; (7) Group 1, males, upper jaws, 807, and (8) Group 2, males, upper jaws, 490.

These values contain a background count emanating from the irradiated dental pulps of the teeth studied. An etching experiment was designed to eliminate this effect. One tooth from the lower jaw of each animal was etched in N/10 HCl in steps of one minute, and filtered. The filtrate of each step was evaporated to dryness and counted for P^{32} as described. The residue of the first etch-fraction of the fluoride-treated teeth

was nearly ten times as radioactive as the same portion for the control group. This demonstrates the importance of oral fluoride ingestion in raising the V_4 value in accordance with the physical-chemical caries-resistance theory.

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Posteruptive effects of fluoridation on first permanent molars of children in Grand Rapids, Michigan

Richard L. Hayes, Norman W. Littleton and Carl L. White. *Am.J.Pub.Health* 47:192-199 Feb. 1957

The present study is concerned specifically with determining whether the fluoridation of water will have any long-term caries-preventive effect on human teeth already erupted when the water supply was fluoridated.

Clinical and bitewing roentgenographic examinations were performed in April 1956 on the Grand Rapids and Muskegon public school children who in 1944-1945 were continuous residents and had two or more first permanent molars in eruption. Fluoridated water had been ingested by 184 of the Grand Rapids children since January 1945 and by 133 of the Muskegon children since July 1951. These children met the requirements of the study in terms of period of ingestion of fluoridated water and quantity of fluorides in the water.

The size of the cavities and restorations in first permanent molars were recorded by the clinical examiner at the time of examination and by the roentgenologist after the roentgenograms from the two cities were randomized. A caries scoring system was used to put the data into a form that could be tested statistically, and the comparability of the clinical and roentgenographic findings was investigated. The final analysis was based on new caries in teeth erupted prior to fluoridation in matched groups of 116 children each. These matched groups, which were balanced for caries susceptibility in 1944-1945, were selected from the children whose fluoride histories met the requirements of the study.

The data indicated that the Grand Rapids children consistently had fewer and smaller cavities than the Muskegon children. For all surfaces the mean caries score was 17 per cent lower in Grand Rapids, for proximal surfaces 14 per cent lower, for buccal and lingual surfaces 31 per cent, and for occlusal surfaces 11 per cent lower than in Muskegon. The findings support the hypothesis that the fluoridation of water will have a caries-preventive effect in teeth that have erupted prior to fluoridation.

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Effect of topically applied agents on enamel. I. Methods for experiments in vitro

T. Mörch, P. Torell and E. Hals. *Acta odont.scandinav.* 14:335 Jan. 1957

A method is described which seems to be a useful implement for the evaluation of the acid resistance established *in vitro* after the chemical treatment of enamel surfaces.

After introductory experiments the following procedure was used: The buccal areas of newly erupted bicuspids, extracted in the orthodontic treatment of children 11 to 14 years old, were divided into halves. One half on each tooth was treated for ten minutes with a solution containing either sodium fluoride (pH 6.8), stannous chloride and sodium fluoride (pH 2.8), or ferrous chloride, ferric chloride and sodium fluoride (pH 2.8). The other half of the area was used as a control.

After the application, the teeth were placed in fresh saliva for one hour and incubated for from 18 to 24 hours at 37° C. in saliva containing 10 per cent sucrose. Ground sections were then prepared and examined in polarized light.

The degree of demineralization of the experimental areas was evaluated by registering the appearance of outer or inner spots (Hals, Mörch and Sand, 1955). The action of the chemical treatment was determined by comparing the treated and the untreated halves.

The investigation showed that sodium fluoride and newly prepared "tin" and "iron" fluoride solutions seemed to be without effect. After being stored for from 1 to 20 days, however, the tin

and iron fluoride solutions obviously increased the resistance of the enamel.

The experiments have been performed with the purpose of working out a suitable method for a detailed study of some of the problems involved in the topical application of substances with a caries-preventive effect. Such investigations are in progress and will be reported later.

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Composition of teeth and bones with varying calcium and phosphorus ratio in diet

Winfrey Wynn and John Haldi. *Internat.A.D. Res. Preprinted Abs.* 3 March 21, 1957

It has been reported that changing the calcium and phosphorus ratio of a cariogenic diet by the addition of either neutral sodium phosphate or calcium carbonate will reduce the cariogenicity of the diet when fed to rats.

The addition of neutral phosphate did not affect the nitrogen, magnesium, carbon dioxide, fluoride, calcium or phosphorus content of the molar enamel and dentin. Analyses of the femurs of these rats showed that this addition of phosphate did not affect the calcium and phosphorus content of the bones. Slightly less carbon dioxide, however, was found in the femurs of the rats on a high phosphorus intake, 3.22 per cent ± 0.06 as compared with an intake of 3.38 per cent ± 0.06 in the controls.

In a second experiment the addition of calcium carbonate to the diet did not affect the nitrogen, carbon dioxide, calcium or phosphate content of the molar enamel and dentin. The calcium and phosphorus content of the bones of these animals also was not affected by the addition of calcium carbonate to the diet. Analyses of the femurs of these rats, however, showed that the amount of carbonate of the bones was increased by the addition of calcium carbonate to the diet. The femurs of the control animals contained 3.14 per cent ± 0.05 carbon dioxide and those of the animals with a high calcium carbonate intake had a carbon dioxide content of 3.45 per cent ± 0.05.

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Fluorides and dental caries in Idaho. IV. Cost of providing dental care for children in fluoride and fluoride-deficient areas

Wesley O. Young. *Newsletter Idaho D.A.* Jan. 1957

In 1951 the continuous-resident children in the first seven grades in Nampa and Coeur d'Alene, Idaho, received dental examinations as part of an orthodontic study. The domestic water supply in Coeur d'Alene was at that time completely deficient in fluoride whereas the Nampa water contained 1.5 ppm of fluoride. The Coeur d'Alene children showed an extremely high caries attack rate, whereas the Nampa children had experienced little dental decay. The 13 year old children in Coeur d'Alene had almost 10 DMF teeth; children in Nampa at the same age had less than two decayed teeth each.

The original examination records were reanalyzed to provide information about the cost of dental treatment, and treatment costs in the two cities were estimated by the application of a common fee schedule.

Generally, complete treatment for the deciduous teeth would have cost about twice as much in Coeur d'Alene as in Nampa. When the average six year old child in Coeur d'Alene started to school he had received $8.38 worth of dental care for the deciduous teeth and he needed an additional $17.09 worth of dental treatment. A child of the same age in Nampa had received about $4 worth of treatment for the deciduous teeth and an expenditure of about $5 would have supplied the additional treatment needed.

The contrast is even more striking for eight year old children in the two cities. At this age the cost of providing complete care for the deciduous teeth in children in Coeur d'Alene would have been more than $30, of which $13 represented care that had been received. Complete treatment of the deciduous teeth in eight year old children in Nampa would have cost less than $13; $5.27 worth of treatment had been received and an additional $7.12 worth of dental care was needed.

The same differential existed in the cost of providing care for the permanent teeth. The total treatment costs in Nampa for care both needed

and received was $3.36 for eight year old children. Children of the same age in Coeur d'Alene, however, had already received $8.52 worth of dental care for the permanent teeth but needed an additional expenditure of almost $11. At age 13 the average child in Coeur d'Alene had received $41.33 worth of dental care but needed $24.21 more. The average cost of providing care for the 13 year old children in Nampa was $10.47 and all except $3.19 of this total represented treatment already received.

The over-all community-wide costs of dental treatment perhaps can best be expressed in terms of cost per thousand children. The examination of the deciduous and permanent teeth of Coeur d'Alene children in the first seven grades indicated they had received about $26,670 worth of dental treatment per 1,000 children, and that they had unmet dental needs which would have cost an additional $29,000 to supply. Each thousand children in Nampa, however, needed only $7,410 worth of treatment, despite the fact that they had received only $6,260 worth of care. It would have cost $21,590 more to provide dental treatment for a thousand Coeur d'Alene children than for a thousand Nampa children.

Fluoridation programs in Idaho usually cost less than 20 cents per person per year. Probably the reduction in the number of teeth requiring extraction and in the pain and suffering caused by badly decayed teeth would alone more than justify the cost of a fluoridation program.

Idaho Department of Public Health, Boise, Idaho

Ability of the various carbohydrates to cause experimental dental caries in the Syrian hamster

C. E. Klapper and J. F. Volker. *Internat.A.D.Res. Preprinted Abs.* 97 March 21, 1957

It has been reported previously that extensive and rapid dental caries occurs in hamsters with nonfunctional major salivary glands. It has been shown also that the inclusion of various kinds of starches in experimental diets modify their cariogenicity. More recent experiments by the authors are concerned with the comparative and interrelated abilities of sucrose, whole wheat and dextrin diets to produce experimental caries.

After desalivation, 60 weanling hamsters were placed on modified H.W.C. (Hoppert, Webber and Canniff, 1931) diets containing 3 per cent alfalfa, 1 per cent salt mixture and 36 per cent whole milk. The remaining 60 per cent of the diet consisted of dextrin, sucrose and whole wheat alone and in combination. The experiments continued for periods up to 65 days.

It was observed that diets containing 30 per cent whole wheat and 30 per cent sucrose caused considerably more caries than diets containing 60 per cent whole wheat or 60 per cent sucrose alone. Diets containing 30 per cent dextrin and 30 per cent sucrose caused about as much caries as the 30 per cent whole wheat–30 per cent sucrose diet. Diets containing whole wheat and dextrin but without sucrose had a limited caries potential.

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Effect of topical application of stannous fluoride on primary teeth

Ralph E. McDonald and Joseph C. Muhler. *Internat.A.D.Res.Preprinted Abst.* 8 March 21, 1957

Previous clinical studies have indicated that stannous fluoride is superior to sodium fluoride as an anticariogenic agent. In no previous study, however, has the deciduous dentition been used to evaluate the effectiveness of stannous fluoride.

Three hundred children who came to the Indiana University pedodontic clinic were divided according to previous caries history into three groups. Group 1 received four topical applications of a 4 per cent aqueous solution of stannous fluoride, and Group 2 received four applications of a 2 per cent aqueous solution of sodium fluoride. The first fluoride application was made immediately after a thorough prophylaxis. The second, third and fourth applications were completed within two weeks. Group 3 received only the prophylaxis and served as the control.

One year after the initial treatments, the children were re-examined by the same dentist. The

data indicated that stannous fluoride significantly reduced the dental caries experience in deciduous teeth as evaluated by the DMF teeth and DMF surfaces indices when compared to the control group.

The children receiving sodium fluoride applications had less dental caries than the control group, but the difference was not significant when the DMF surfaces index was used, and was significant only at the 0.09 level of confidence when the DMF teeth index was used, when compared to the control. The stannous fluoride was significantly superior to the sodium fluoride at the 0.05 level of confidence when either the DMFT or DMF surfaces index was used.

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Observations of caries susceptibility tests of young male adults

Gordon H. Rovelstad. *Internat.A.D.Res. Preprinted Abst.* 60 March 21, 1957

The rate of flow of stimulated saliva, pH of the saliva sample, the acid-neutralizing ability of the saliva sample, the lactobacillus count, the acid-producing ability and the hyaluronidase activity of saliva were studied simultaneously in young adults.

Three test groups were established for analysis. Group A consisted of 63 patients completely free from dental caries or any evidence of caries experience. Group B consisted of 46 patients with a minimum of caries experience (DMF count of four or less). The patients in Group C were selected at random and had an average DMF count of 14.5. Under supervision, 20 ml. of saliva stimulated by the chewing of paraffin was collected from each subject at 11 A.M. after five hours of supervised fasting.

The median results of tests carried out on three different samples of saliva collected under the same conditions at weekly intervals were as follows:

1. The lactobacillus count of saliva correlates directly with the caries experience.
2. The acid-producing ability of saliva correlates directly with the caries experience.
3. The rate of stimulated flow of saliva correlates inversely with the caries experience of the patient.
4. No relationship is demonstrated between the acid-neutralizing ability of the saliva and the caries experience.
5. No relationship is demonstrated between the pH of the saliva sample and the caries experience.
6. No relationship is demonstrated between the hyaluronidase activity of the saliva sample and caries experience.

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Fluorine in teeth of Israeli children, in relation to fluorine in domestic waters and to dental caries prevalence

Jtzhak Gdalia and Jacob Yardeni. *J.D.Res.* 36:203-207 April 1957

A survey of the fluorine content in the various drinking water supplies in Israel, published in 1953, was a basis for the present study of the fluorine content of the tooth and its correlation with the DMF index, established in a recent survey of the dental caries prevalence among school children.

One hundred and twenty-seven shed deciduous teeth from 114 children living in places with different drinking water supplies were analyzed for the trace element fluorine.

In areas with low fluorine content in the teeth, the communal dental caries index is relatively high, going up to 2.88; in areas with higher fluorine values in the teeth, the dental caries index goes down to 0.51 (in Kiriath-Chaim), the lowest in Israel.

There is a wide range of fluorine content in teeth of children living in the same or in different places with about the same fluorine content in the drinking water. Sound teeth of the same individual do not always show an identical fluorine content, and the difference may be considerable. The reasons for these phenomena are not known and merit investigation.

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Hygiene and prophylaxis

The history of the toothbrush
(Beitrag zur Geschichte der Zahnbürste)

Ernesto Cohn. *Bl.Zahnhk., Zurich* 17:251-252 Jan. 1957

Familiarity with the history of the toothbrush is important for the dentist because the notion about toothbrushes and toothbrushing, commonly accepted by the general public, has been opposed recently by some leading practitioners.

The most important function of the toothbrush is to stimulate gingival tissue. Cleaning the teeth, although of significant value, is a secondary function.

A survey of history indicates that many centuries ago, long before the Christian era, oral hygiene was practiced to a pronounced degree, and its significance as a health measure was appreciated to such an extent that it was incorporated in many religious rituals.

In which country and at which period toothbrushes were first used is unknown. In China, as documented by literature and art works, the toothbrush was known more than ten centuries before Christ.

In India, ancient sacerdotal and medical scripts mention that priests must clean the mouth and teeth with toothbrushes after each meal before performing any religious ceremony.

In ancient Greece and Rome, oral hygiene was well known. Marcus Valerius Martialis (100 B.C.) used the term "dentifricium" for oral hygiene and toothbrushing in one of his epigrams in which he ridiculed an old courtisan for cleaning her artificial teeth with a toothbrush twice a day.

The Indians of Aztecan and Nahuatlan stock, and also their Toltec and Chichimec predecessors, used toothbrushes resembling those of ancient China and India. They were chew-sticks with one end beaten to a soft, fibrous pulp and not only cleansed the teeth but applied a gentle massage to the gingiva.

Although the bristle toothbrush came into general use in Europe not before the eighteenth century, among the various articles found in Hallstatt, Austria (Hallstatt epoch from 1,500 to 500 B.C.), were thin bronze instruments pointed on one end which may be assigned as a toothpick-toothbrush combination.

Among Mohammedan tribes, invading Europe, toothbrushes, called "miswăk" or "siwăk," were used.

In 1729, the English natural philosopher, Stivel, reported that he purchased a toothbrush at the market place in Venice, which useful instrument had been imported from France. A short time before, Diderot described a French toothbrush and recommended its use.

Reference to the hair-bristle toothbrush was made on three different occasions before 1800. In 1640, the bristle toothbrush was mentioned in the *Memoirs of Sophia, Electress of Hanover;* in 1649 in the *Memoirs of the Varney Family,* and in 1729, an account of the private possessions of Francis Sitwell of Renishaw was published in which the item, "a toothbrush worth four pennies," was listed.

The time of Pierre Fauchard's activities in dentistry, from 1678 to 1761, appears to be the period in which toothbrushes were used by the nobility in France, Austria, Germany, Italy and England.

From this time, the manufacture and use of toothbrushes have developed rapidly, especially within the last three decades.

Growing recognition of the importance of oral hygiene in the maintenance of general health has merited the toothbrush a careful study in regard to quality, purpose and gradual evolution.

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Removal of stains on teeth

J.A.M.A. 163:1312-1313 April 6, 1957

Q. Is there any combination of chemicals that can loosen or remove the brown stains on teeth caused by tobacco tars without being injurious to the teeth or mouth? Does the tar unite with tooth enamel?

A. Despite the marketing of several drug preparations for the removal of dental calculus and stains, there appears to be no effective material that may be used without real or potential hazard to the enamel surface. Some of the agents offered

in the past consisted of acid solutions, which decalcified portions of the tooth. Recently, chelating agents have been incorporated in a preparation marketed for calculus removal. The fundamental nature of the tobacco-staining mechanism has not been studied extensively, and there is no evidence to indicate that the pigments enter into physicochemical combination with the apatite structure of the dental enamel. It is more likely that the tobacco tars are incorporated into the proteinaceous plaque or film that collects on and adheres to the tooth surface.

Stains on the teeth may be removed most reliably by the methods employed in prophylaxis at the hands of a dentist or qualified dental hygienist. Recurrence of objectionable stain between treatments may be delayed or prevented by proper oral hygiene.

The effectiveness of a tyrothricin dentifrice in the control of dental caries

F. R. Shiere. *J.D.Res.* 36:237-244 April 1957

A study was undertaken (1) to evaluate the effectiveness of toothbrushing with a dentifrice containing tyrothricin in the control of dental caries in hamsters, (2) to evaluate a dentifrice containing tyrothricin and insoluble sodium metaphosphate in a clinical study with children, and (3) to evaluate the capacity of this dentifrice for the clinical control of human dental caries.

Six dentifrices, one control and five containing tyrothricin, were evaluated for their effect in reducing caries in the hamster. Paste no. 15 (containing insoluble sodium metaphosphate-decalcium phosphate polishing agent plus 0.05 per cent tyrothricin) proved to be the most effective, producing a 25.6 per cent reduction in the number of carious surfaces. Four of the remaining five tyrothricin dentifrices were also effective, but less so; the caries inhibition increasing as the concentration of tyrothricin increased. Paste no. 74 contained dicalcium phosphate as polishing agent with 0.05 per cent added tyrothricin; this produced a 14.3 per cent increase in the number of carious surfaces which is also statistically significant. There is no explanation for this increased caries activity.

Four hundred and twenty-five children 7 to 13 years old were divided into two groups of similar age and sex distribution. One group used dentifrice no. 15, the other, dentifrice no. 24. Both dentifrices were identical except that no. 15 contained 0.05 per cent tyrothricin. The incidence of new decayed and filled permanent tooth surfaces was reduced by 35 per cent after one year and by 26 per cent after two years of brushing with the tyrothricin tooth paste.

The reductions in caries are highly significant, and may be ascribed to the presence of the tyrothricin, since identical oral hygiene procedures were followed in both experimental and control groups.

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Statistical research

The incidence of unrecognized diabetes in dental practice

Rene Rochon and Joan Moran. *Internat.A.D.Res. Preprinted Abst.* 81 March 21, 1957

This is the final report of a five year study of the presence of unsuspected diabetes and nephritis in ambulatory dental patients. At the University of Detroit Dental Clinic, 3,122 patients of both sexes, 12 to 80 years old, were screened. Signs of diabetes were found in 43 patients, only five of whom were aware of their condition. One hundred and six potential instances of nephritis were also discovered.

A question arises whether this is a dental problem. If so, the role dentistry should play in the early detection of these diseases should be determined.

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Basic science

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Pathology

Treatment of radiation necrosis of the soft tissues of the oral cavity: a report of two cases

J. Harold Klock. *Eye,Ear,Nose & Throat Monthly* 34:164-167 Feb.-Mar. 1957

Radiation necrosis of the soft tissues of the oral cavity usually follows roentgenotherapy of malignant growths. Although this therapy destroys the growths, there frequently follows mass necrosis of the region which is difficult to control. The lesion of radiation necrosis begins with erythema and tenderness in the irradiation scars which had been intact; the lesion tends to enlarge and involve what had previously been healthy tissue. Fifty per cent of all breakdowns develop more than two years after the conclusion of roentgenotherapy.

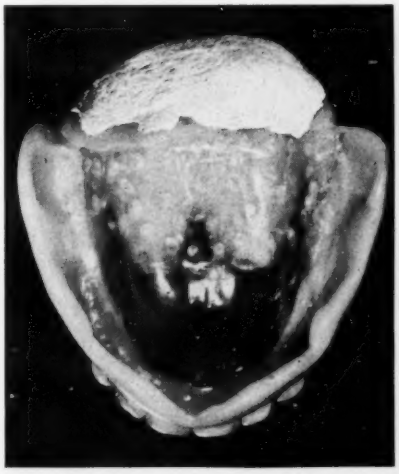
The author's success in treating several patients having radiation necrosis of the soft tissues of the mouth suggests that application of the following principles will yield satisfactory results:

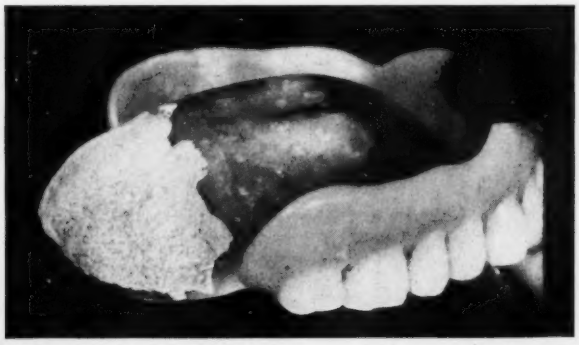
1. The lesion should be covered by an appliance which functions to immobilize the part and to protect and hold various medications, especially those with analgesic and bactericidal qualities.

2. Mouthwashes and other antiseptics may be used at periods when the appliance has been removed, but are of little value.

3. The general health or resistance factor of the patient should be improved, if possible, by available aids, including adequate nutrition and other indicated medical treatment.

A 50 year old white woman, 28 months after receiving roentgenotherapy for an early squamous





Above left: Appliance to cover the lesion. The periphery is extended to the posterior border of the soft palate. Above right: Profile view of the appliance. Below right: Appliance in position. The posterior border extends to the uvula, nearly covering the entire soft palate

cell carcinoma on the right side of the soft palate near the midline, complained of soreness in the treated region which exhibited atrophy and telangiectasis. Several weeks later an ulcer developed in the treated region, with an adherent white slough. The ulcer persisted for several weeks in spite of local treatment and was accompanied by excruciating pain.

The ulcer was slightly over 1 cm. in diameter, and was accompanied by extreme inflammatory changes radiating laterally across the entire soft palate.

An appliance was constructed to cover the ulcer. On the posterior border of the appliance, surgical cement was placed over the lesion. The cement was covered with petroleum jelly to avoid burning, before the appliance was inserted in the mouth. After about 15 minutes the pain disappeared completely. During the entire course of treatment no further sedation was necessary. (The patient had been sedated every three hours by either morphine or codeine.)

The side effects of the narcotics subsided spontaneously. Swallowing became painless and normal. Two months later the pathologist's report and clinical examination revealed that complete healing of the ulcerated mucosa had taken place.

A 54 year old white man was seen with a similar complaint. An appliance was made by incorporating surgical cement into a large piece of cotton which was packed into the floor of the mouth, pressing against the teeth for retention and pressing against the base of the tongue to make speech difficult and thus encourage rest of the tongue. This afforded almost immediate relief to the patient. This treatment was continued. Four months later the lesion was pronounced completely healed.

After the pain has been alleviated by the appliance, antiseptic and analgesic mouthwashes may be prescribed. An aqueous solution of 5 per cent urea was found to be efficacious.

The role of antibiotics appeared to be relatively unimportant in these two cases. The woman patient responded well without antibiotics and the man patient did not seem to benefit from their use.

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Parotid swelling, alcoholism and cirrhosis

Stanley J. Wolfe, W. H. J. Summerskill and Charles S. Davidson. *New England J.Med.* 256:491-495 March 14, 1957

Chronic, noninflammatory enlargement of the parotid glands has been noted in populations whose food supplies are inadequate and in persons suffering from malnutrition and certain chronic diseases. This report presents clinical and laboratory observations on 16 patients—9 men between the ages of 40 and 67 and 7 women between the ages of 29 and 66—with hepatic cirrhosis associated with chronic alcoholism who had bilateral, symmetrical parotid swelling. The patients studied on the medical wards of the Boston City Hospital had been admitted primarily for treatment of severe liver disease or the complications of alcoholism. All had chronic alcoholism of long duration, and 14 had unequivocal physical and biochemical evidence of hepatic cirrhosis. Diagnosis was confirmed by autopsy or needle biopsy of the liver in eight patients.

Normally, the parotid glands are not palpable, and a concavity exists in the region between the superior ramus of the mandible and the anterior margin of the sternocleidomastoid muscle. In the patients examined, the glands were palpably enlarged, and the concavity was completely or partially obliterated. The swelling was bilaterally symmetrical, imparting a characteristic alteration to facial contours. The swelling predominated in the region of the posterior third of the gland. When the swelling was severe, the ear lobes were hidden when the patient was viewed from the front. The glands had a firm, rubbery consistence. They were neither tender nor inflamed, and the overlying skin was freely movable. Two patients had associated swelling of the submaxillary salivary glands. None of the patients was aware of the enlargement of the salivary glands or of the change in facial appearance. None complained of dry mouth, excessive salivation or local pain.

Nine of the 16 patients died from hepatic failure with severe icterus. One patient was less jaundiced and her death was not due primarily to hepatic failure. Six patients survived, five of whom had less derangement of liver function than those who died. Hepatomegaly, ascites and spider

angiomas were present alone or in combination, but no patient had a palpable spleen. In seven patients in which liver tissue was obtained, histologic changes of fatty metamorphosis, bile duct proliferation, hepatic cell necrosis and the presence of hyaline degeneration were found. In two patients parotid swelling, present on hospital admission, subsided as the clinical state improved. The extent and character of parotid hypertrophy otherwise did not vary between the fatal and the surviving groups.

The pathogenesis of parotid hypertrophy under the conditions reported is unexplained. The results of this study lend support to claims in the Italian and French literature that asymptomatic enlargement of the parotid glands is frequently found in patients with chronic alcoholism, most of whom have hepatic cirrhosis.

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Rhabdomyoma of the alveolar and buccal mucosa: report of case

(Rabdomioma della mucosa della guancia: rare localizzazione di tumore muscolare)

Franco Torrielli. *Minerva stomat.* 6:32-35 Jan.-Feb. 1957

The patient, a 46 year old man, had a seemingly benign tumor of striated muscle reaching from the alveolar to the buccal mucous membrane. Primarily it was thought to be a thyroglossal cyst. The tumorous mass was encapsulated and measured about 3 cm. in diameter.

After histologic examination, the tumor was diagnosed as rhabdomyoma consisting mainly of spindle cells with vesicular and hyperchromatic nuclei and large round cells containing several nuclei in which striation was present. The tumor was removed surgically by neck incision.

After the operation, the patient was irradiated with 900 r on each side of the neck. Two months later, pedunculated masses reappeared near the glossoepiglottic recess. This neoplasm continued to extend locally in spite of renewed irradiation. There were no metastases.

According to textbooks and reports in dental and medical literature, rhabdomyoma, when benign, may form a slowly growing lumpy mass beneath the mucosa. When malignant the tumor grows rapidly and is liable to recur after excision. Rhabdomyoma, and its related forms, rhabdomyoblastoma and rhabdomyochondroma, rhabdomyomyxoma and rhabdomyosarcoma, seldom occur.

In the case reported, an unquestionably benign rhabdomyoma recurred near the site of the eliminated tumor, accompanied by neuralgic, burning and shooting pain.

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Oral lichen planus and leukoplakia: differential diagnosis and treatment

Harry L. Levin. *U.S.Armed Forces M.J.* 8:198-208 Feb. 1957

Lichen planus of the mouth is not an important disease in itself, as it causes no subjective symptoms and has no serious sequelae. It is significant, however, from a diagnostic standpoint as it is frequently mistaken for leukoplakia, a disease of great importance. Patches of leukoplakia that have reached the verrucose, papillomatous and ulcerated stage or contain hard nodules may be cancerous, and require an adequate biopsy.

Lichen planus is characterized by filigree-like or annular markings on the buccal mucosa, with definitely outlined, round or polygonal, pearly white nodules; whitish streaks on the tongue, and accompanying lesions on the skin. Magnification may show a network of bluish white lines (Wickham's striae). Early lesions usually are erythematous with a violet tinge, whereas older ones tend to be darker.

Lichen planus is often associated with nervous tension or instability; is found as frequently in men as in women; is not accompanied by adenopathy, and may be painful at the onset in the oral cavity.

Leukoplakia is found at the sites of irritation (sharp, ragged edges of teeth, ill-fitting dentures, and so forth), or of previous irritation, such as the site of a former syphilitic gumma. It is usually associated with poor dental hygiene and excessive smoking. It is more common in men than in women.

Leukoplakia appears as a leathery thickening of the mucosa, with a pearly silvery sheen. It occurs as lactescent, superficial patches of various sizes and shapes which may coalesce to form rather extensive sheets. The lymph nodes usually are not involved until the malignant stage is reached. Leukoplakia is usually not painful until the advanced stages. One out of four instances will develop malignant tendencies.

Treatment of lichen planus usually is unsatisfactory. Radiation therapy provides no appreciable relief. Curtailment of smoking and moderation in the use of condiments are helpful. Methylrosaniline chloride (gentian violet) 1 per cent is used widely. The author recently has used a topical ointment of fluorocortisone acetate (0.25 per cent) for treatment of extensions of the dermatologic conditions into the oral cavity, with gratifying results. This material is one of the most potent of the adrenal cortical hormonal agents, and is absorbed readily by the mucous membrane and skin. Others have reported favorable results in the oral lesions with the topical application of hydrocortisone ointment (2.5 per cent).

Patients with leukoplakia, treated with large daily doses of 100,000 units of vitamin A and 500 mg. of vitamin C, showed pronounced improvement in from one to three months. Electrodesiccation and fulguration usually are effective in the early lesions of leukoplakia.

If certain dermatologic diseases with oral manifestations resist all forms of treatment within the scope of the dental surgeon, he should refer the patient to an internist or dermatologist for confirmation of diagnosis and treatment.

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Intelligence and cleft palate

Brit.M.J. No. 5016:454 Feb. 23, 1957

The intelligence of children with congenital malformations, apart from those such as mongolism in which the brain is directly affected, has been little investigated. Illingworth and Birch, of Sheffield, recently made a survey of children with cleft palate. One hundred and twelve children in the original sample had reached the age of four years; of these, 54 had cleft lip and cleft palate, and 58 had cleft palate alone. Eighty of the children were tested with the Terman-Merrill test. The mean I.Q. was 95.4, which was significantly different from the assumed mean of 100. Of the 80 children tested, 3 had an I.Q. below 50, 5 had an I.Q. between 50 and 70, and 5 had an I.Q. of over 120. No difference was found between the children with both cleft lip and cleft palate and those with cleft palate only.

This evidence that there is a tendency for children with cleft palate to be below average intelligence is borne out by P. Fogh-Andersen's observations in Denmark (1943) that 59 instead of an expected 20 children with cleft lip and cleft palate were present among 17,000 mentally defective children.

Illingworth and Birch suggest two possible explanations of their finding. One is that the lower intelligence is due to the same factors, genetic and environmental, as are responsible for the malformation. The other is that there is a tendency for independent genetic factors involved in the deformity and the dull intellect to become associated in the lower strata of society. In Fogh-Andersen's Danish study, there appears to be no tendency, however, for the two malformations to be more common in the lower social strata.

British Medical Journal, Tavistock Square, London, W.C. 1, England

Oral leukoplakia: review of the literature

H. C. Russ. *J.Oral Surg.* 15:40-49 Jan. 1957

A partial review of the literature (52 references) has led to the following conclusions:

1. The majority of writers indicate that they believe leukoplakia is a precancerous lesion.

2. There is not a large volume of conclusive evidence that leukoplakia is a precancerous lesion.

3. Many leukoplakia lesions are being diagnosed and treated from clinical observations without benefit of biopsy.

4. There is a need for standardization of terminology and method of diagnosis.

5. If dentists are using a follow-up system of their patients with leukoplakia, they are not reporting the results in the dental literature.

6. The areas of the subject in need of further research are as follows: review of the literature as to the comparative value of the present methods of treatment; case history study of hospital records of oral cancer in those patients with an initial diagnosis of leukoplakia; experimental study to determine whether leukoplakia will regress spontaneously when the causative agent is removed; experimental study to determine whether leukoplakia can be transplanted to another animal, and experimental study to determine what abnormal change takes place in the individual cells in an area of leukoplakia.

7. The acceptance by the dental profession of Kollar's classification (1954) for maturation disorders in the epithelium of the oral mucous membrane would afford better communication of observations by clinicians and authors discussing this pathologic condition.

8. The acceptance of dyskeratosis as a prerequisite for the pathological diagnosis of leukoplakia might well afford a basis for mutual understanding of an oral condition about which so little is actually known but about which so much has been written.

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Erythema multiforme exudativum

Bruno W. Kwapis. *Oral Surg., Oral Med. & Oral Path.* 10:363-369 April 1957

The frequent development of oral manifestations of erythema multiforme exudativum should make this dermatosis of interest to the dentist. The oral findings in nine patients with this disease are reported.

The more common and less severe form of the disease, with cutaneous and oral lesions primarily, is referred to as "erythema multiforme exudativum minor." This disease is self-limiting, has a rapid onset of from 12 to 24 hours, and may last for from one to several weeks. It is primarily a disease of young men. The incidence of the disease appears to increase during the spring and fall, which suggests that the disease may be seasonal.

The six patients in this series were men from 19 to 35 years old, of whom two were negroes. All had oral lesions, although it is not uncommon for such lesions to be absent. The oral lesions were found on the lips, buccal and gingival mucosa, tongue, hard and soft palates, and even the pharyngeal wall. The initial stage in the development of the oral lesions is a bleb or vesicle, which is present for a brief time only. These vesicles contain a clear fluid, the inflammatory exudate. Movement of the mucosal tissues during mastication contributes to an early rupture of the vesicle. Desquamation of the covering epithelium exposes the underlying raw tissues to form a painful ulcer. When large areas of epithelium slough in this manner, the patient will complain of discomfort and pain during mastication and swallowing of food, which necessitates a soft to liquid diet.

The exudate dries, covering the wound with a bloody crust. In areas where the wound was exposed constantly to saliva, a slimy, gray-white membrane formed. The probably secondary infection leads to a fetor oris. In several patients, the dorsal surface of the tongue was covered by a whitish pseudomembrane which, when peeled, exposed a raw, bleeding surface. Despite the dehydration, excessive salivation was noted in most patients, and was more profound when the intraoral lesions were extensive and severe. Healing of the oral lesion was hastened by the use of systemic antibiotics.

Erythema multiforme exudativum major is the more severe form of the disease which manifests itself not only with cutaneous and oral lesions but with ocular and genital involvement. The ocular lesion is a conjunctivitis which can lead to permanent loss of vision. Three patients were in this group.

The etiology of the disease is unknown. Suspected as contributing or causative factors are the following: ingestion of such drugs as sulfonamides, salicylates, quinine, arsenic, belladonna, iodides and certain serums; infectious diseases such as typhoid fever, diphtheria and pneumonia, and certain noninfectious diseases such as arthritis and nephritis. One patient among the nine developed the lesions after the use of a sulfonamide and another after the use of acetylsalicylic acid.

Therapy is basically symptomatic. The administration of antihistamines counteracts the severe itching, especially in the early stages of the dis-

ease. Drying lotions of zinc oxide or starch and soda are recommended for the less severe form of the disease. If the patient is febrile, a broad spectrum antibiotic should be administered, otherwise salicylate therapy is indicated. Treatment should be the responsibility of a physician.

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Alterations in the blood condition accompanying dental abscesses

(Welche Veränderung zeigt der Blutstatus bei dentogenen Abszessen?)

Ernst Lautenbach. *Schweiz.Mschr.Zahnhk.* 67:205-229 March 1957

Many authors have described various systemic reactions of the human organism to the presence of abscesses in the oral cavity. These reports have emphasized fluctuations in temperature and pulse and a rapid decrease of erythrocytes and leukocytes in the blood.

It can be assumed that infection of root canals and periodontal disease are the main causative factors in the formation of alveolar and apical (subperiosteal and submucosal) abscesses.

At the Dental Clinic of the University of Bonn, Germany, the blood count and sedimentation rate were determined in 140 patients who were afflicted with various types of oral abscesses. Blood count was taken in 108 patients during and after the period of acute inflammation, and in 32 patients before the surgical elimination of the abscess.

The results were as follows:

1. The sedimentation rate, measured with a sedimentometer, was normal in 58 of 108 patients examined during the subperiosteal and submucosal phase.

2. An increased sedimentation value was determined in 49 patients; however, 23 patients returned to normal before termination of treatment.

3. In 61 patients an increase in the number of leukocytes during the inflammatory phase was observed. In 44 patients the leukocytic count remained normal, and in 17 patients there was only a slight increase during and after treatment. The total white count, establishing the number of leukocytes in 1 cc. of blood, seems to permit an accurate evaluation of systemic reactions within the human organism to the presence of abscesses in the oral cavity.

4. The differential blood count, establishing the number of each variety of leukocytes in a count of 100 leukocytes, proved to be of little help in evaluating systemic reactions.

5. In the majority of patients, the body temperature remained almost normal (between 98.6° and 100.4° F.). When subperiosteal abscesses were present, the temperature was higher.

6. Blood sedimentation rate and leukocytic count are not necessarily in proportion to each other. In several instances, an increase in the number of leukocytes was accompanied by almost normal sedimentation. Increase in the number of leukocytes seems to be more indicative of the presence of pyogenic infections than does an increase in sedimentation rate which can be indicative of a number of pathologic conditions.

7. The course of infection in instances of oral or dental abscesses, described by Victor Schilling as "consisting of a neutrophilic active phase, a monocytic defensive phase and a lymphocytic-eosinophilic end phase," was seldom observed.

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Bruxism, a classification: critical review

Samuel C. Nadler. *J.A.D.A.* 54:615-622 May 1957

Bruxism may affect so large a percentage of the population as to approach universality. This condition appears at practically all ages in man, and may be as old as man himself. It may occur in several generations of a family—how much is due to heredity and how much to mimicry is a question to be considered.

Research is indicated as to the etiology of bruxism, whether it be on a local, systemic, psychological or occupational basis. Many causes have been advanced but not all have been substantiated. Distinction should be made as to whether concomitant, incidental, predisposing factors or true causes are being dealt with.

The term bruxism should be officially desig-

nated as an all-inclusive term for the abnormal grinding and clenching habits regardless of when they occur. Bruxomania should be considered as a specialized form of bruxism.

The dental profession should become more observant of the characteristic manifestation and incidence of bruxism, especially in patients with periodontal disease, as the unconscious quality of the act keeps it often undetected.

The major causes of bruxism seem to be psychological and concerned with the personality of the individual.

Acts which have heretofore been considered innocent ones may now be construed as vicious concomitants of the habit of bruxism, such as the chewing of gum and the biting and clenching of foreign objects. These will bear close scrutiny as decisive factors in the increasing incidence of bruxism.

It would appear that the act of bruxism affords the individual an opportunity to take out on his own body the frustrations and tensions which beset his personality.

The role of physical and mental stress as causation to bruxism in daily living is significant. The occupational background of patients afflicted with abnormal bruxistic habits should be examined in order to determine how the relief from tension or the release of tension may be channeled into less destructive paths.

Extensive research studies in children who have bruxism are recommended with these questions to be considered: (1) What kind of child develops the act? (2) Is there a factual basis for the relation between the sucking habits and the bruxism habits of the child? (3) Is there a common denominator in children who develop bruxism? If suitable answers can be found to these questions, and if adequate early assistance is given the child, can the condition be prevented and further damage minimized?

Research, combined with psychological and clinical laboratory studies, is also indicated into the instances involving the jaws and teeth in seemingly innocent acts which tend to degenerate into the habit of bruxism, so that the part apparently played by the compulsion of the psyche can be fully evaluated by both the medical and dental profession.

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Accessory submaxillary gland

Albert David Alexander. *New England J.Med.* 256:265-266 Feb. 7, 1957

A 32 year old woman was referred for evaluation of a mass in the floor of the mouth. She was convinced she had cancer. Three weeks previously she had become aware of soreness in the right mandible. The previous day she found a "swelling" in the floor of the mouth in the same general region.

Physical examination revealed that the only abnormality was that the right submaxillary gland felt somewhat "doughy" and enlarged. The duct was distended and tender to deep pressure. A turgid mass measuring some 2.0 cm. in diameter was demonstrable at about the middle third of the duct. No significant cervical adenopathy was demonstrable. The clinical impression was sialolith of the right submaxillary duct.

Noncontrast roentgenograms failed to reveal a salivary stone. A sialogram showed an accessory submaxillary gland. No treatment was instituted, and the patient was re-examined one week later, when she had no complaints. The mass in the floor of the mouth was no longer palpable.

A low-grade sialadenitis of the right submaxillary gland and consequently of the accessory gland undoubtedly accounted for the swelling, which spontaneously regressed as the sialadenitis subsided.

608 Medical Arts Building, Norfolk, Va.

Multiple benign mixed tumors

Arthur J. Kuhn, Kenneth D. Devine and William H. ReMine. *Proc.Staff Meet.Mayo Clin.* 31:544-551 Oct. 3, 1956

Although so-called benign mixed tumors, usually occurring in the region of the major or minor salivary glands, are relatively common, the occurrence of more than one such primary tumor in the same patient is exceedingly rare. Only 19 instances have been found in the literature. In the last 50 years, about 1,400 patients with single primary mixed tumors have been encountered at the Mayo Clinic, whereas only five instances of multiple primary mixed tumors have been found.

The rarity of such instances casts doubt on the belief that multiple primary tumors are the cause of "recurrences" of mixed tumors after their removal.

A 47 year old housewife complained of lumps behind both angles of the mandible, the one on the left having been noted for 17 years and the one on the right for three years. Both had slowly increased in size since their detection, and neither had caused pain or other symptoms. The masses were excised. Histologic examination showed them to be mixed tumors of the parotid glands.

The second case involved a 59 year old housewife found to have a mixed tumor on the left side of her face. This was removed. Five years later the patient returned because of a painful lump in the right side of her face. Examination revealed this to be a mixed tumor.

A 33 year old housewife had noticed a swelling on the right side of her nose. Examination also revealed a small mass in the left parotid region. Both were mixed tumors.

A 69 year old woman had bilateral mixed tumors of the parotid gland. The tumor on the left was recurrent, having been first treated 23 years before; the tumor on the right was previously untreated, and of 15 years' known duration.

A 52 year old woman who had come to the clinic for a general examination was found to have bilateral parotid tumors which apparently had been present for five or six years.

Mayo Foundation, Rochester, Minn.

Endotheliomyelosis—an experimental model of the "focal syndrome"

Hans Selye and Pierre Bois. *Oral Surg.,Oral Med. & Oral Path.* 10:37-51 Jan. 1957

The syndrome of endotheliomyelosis represents one of the most important links between dental and general medicine. The authors have developed a technic to reproduce this syndrome consistently in experimental animals.

Female Sprague-Dawley rats, with an initial body weight of about 100 Gm., are unilaterally nephrectomized and henceforth given exclusively 1 per cent sodium chloride as a drinking fluid. Immediately after the operation, the rats receive daily subcutaneous injections on the back of 0.2 ml. of a 4 per cent casein solution thoroughly mixed with equal volumes of Freund's adjuvant. This solution is placed in a bottle provided with a rubber stopper and material is withdrawn from it for injections daily, without sterility precautions.

Under these conditions, the accidental contamination through the needle used for the injection of the rats invariably caused a typical syndrome of endotheliomyelosis in all animals within 10 to 15 days. The first clinical manifestations of the syndrome were the development of local nodules at the injection sites, polyuria and dyspnea with cyanosis of the skin. Apparently, solutions thus prepared for injection represent an ideal medium for the development of the kind of microbial flora which is most reliably conducive to the development of endotheliomyelosis.

The most characteristic components of the syndrome are: (1) endocarditis, (2) nephritis-like renal lesions, (3) adrenal changes which are not merely nonspecific manifestations of stress (for example, PAS-positive granules) and (4) a pronounced tendency toward ectopic myelopoiesis, especially in the spleen, adrenals and liver. Further work may show other manifestations which belong to this syndrome. Analytic work has merely begun and the following facts have come to light:

1. In rats not sensitized by unilateral nephrectomy and an increased sodium chloride intake, focal infection is still capable of producing endocarditis and myeloid tissue proliferations, but the renal lesions are much less evident and there is no, or only slight, polyuria.

2. Adrenalectomized animals are extremely sensitive to focal infection and mortality among them is high, even if large doses of corticoids are given as substitution therapy.

3. In animals with intact adrenals, somatotrophic hormone greatly facilitates the production of endotheliomyelosis by various agents.

4. The structure of the pathogenic focus is obviously of the greatest significance.

5. A great deal of evidence shows that Group A hemolytic streptococci play a specific role in producing rheumatic fever and cognate lesions in man and in experimental animals.

6. The distant effects of a pathogenic focus may outlast its existence.

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Cervicofacial actinomycotic mixed infection: report of 120 cases (Beiträge zur zerviko-fazialen aktinomykotischen Mischinfektion: an Hand von 120 beobachteten Fällen)

Otto Lorenz. *Österr.Zschr.Stomat.* 53:235-243 May 1956

During the last decade, 120 patients afflicted with cervicofacial actinomycotic mixed infection have been observed and treated at the Clinic for Oral and Facial Surgery of the "Hüttenhospital" in Dortmund, Germany.

Treatment with comparatively large doses of penicillin and other clinically tested antibiotics (streptomycin, tetracyclines and sulfonamides) was the method of choice in the majority of instances.

In severe instances, roentgenotherapy was added to the antibiotic treatment. In patients with well-functioning defense mechanisms, treatment with Lentze's actinomyces antigen proved to be successful.

In instances in which cervicofacial actinomycotic mixed infection appears in suppurative alveoli after tooth extractions, the causative factors, such as facultative anaerobes, can be eliminated by the application of hydrogen dioxide.

Luisenstrasse 27, Dortmund, Germany

Diseases of the teeth and their supporting tissues in diabetic patients (Erkrankungen der Zähne und ihres Halteapparates bei Diabetikern)

G. Mohnicke and K. H. Ulrich. *Klin.Wschr.* 34:432-434 April 15, 1956

In serial examinations of patients afflicted with diabetes of all types and in different stages, it was observed that diabetes frequently is accompanied by caries, gingivitis, stomatitis, periodontitis and periodontosis.

Although there were a small number of diabetic patients free or comparatively free of pathologic symptoms in the oral cavity, in patients mainly belonging to the short, thick, stocky type, the existence of a relation between diabetes and oral or dental diseases can be assumed.

Reports of this relation, however, are scarce in medical and dental literature but various terms such as "diabetic periodontal disease," "diabetic gingivitis," "diabetic stomatitis," "diabetic periodontoclasia" and others have been introduced.

In the serial examinations, the presence of gingivitis and periodontal disease was established in 21 per cent of patients in the initial stage of diabetes.

A relation between periodontal disease and diabetogenic disturbance in the vascular system exists without any doubt. In 222 diabetic patients without such disturbances, 39 per cent were afflicted with periodontal disease. In 278 diabetic patients, 69.9 per cent showed the symptoms of periodontal disease.

By recognizing the relation existing between diabetes and oral or dental diseases, the dentist can help the physician in the discovery of some of the millions of unknown diabetic patients.

Robert-Kochstrasse 27a, Münster, Germany

Cerebral damage dated by faults in dental enamel

William F. Via, Jr., and John A. Churchill. *Internat. A.D.Res.Preprinted Abs.* 73 March 21, 1957

In a study of the causes of cerebral disorders in children, the thought arose that if the brain had been disturbed by disorders of metabolism, the enamel forming on the teeth at the time might be disturbed also. A study was begun to determine the correlation between cerebral disorders and enamel hypoplasia in children.

Detailed information concerning heredity, gestation, birth and subsequent development was obtained from the parents or the medical records of 100 children who had definite indications of cerebral dysfunction determined by clinical and laboratory means. The teeth of these children were examined and data concerning the location

and type of enamel faults were tabulated. In addition, the teeth of 100 apparently normal children were examined for enamel faults. Those that had enamel defects of the teeth were investigated to see if they had cerebral damage. The medical histories of 40 of the normal children were investigated so that a comparison of possible etiologic factors could be made.

The incidence of enamel hypoplasia in the normal group was 10 per cent. In contrast to this, 68 per cent of the children with cerebral damage showed enamel hypoplasia. A chi square and a significance ratio statistical evaluation of the data indicated a significant difference between the two groups of children. In the cerebral disorder group 58 children had neonatal enamel hypoplasia and 19 children had prenatal enamel hypoplasia. Some children had both prenatal and neonatal hypoplasia. No prenatal hypoplasia was noted in the normal children. The rate of enamel hypoplasia—neonatal, prenatal or both—for each manifestation of cerebral disorder was: athetotic, 100 per cent; spastic diplegia, 100 per cent; hemiplegia, 43 per cent; the epilepsies, 54 per cent; oligophrenia, 52 per cent, and other disorders combined, 79 per cent.

Henry Ford Hospital, Detroit, Mich.

Fundamental studies on the antral floor

Shinichi Miura. *Ochanomizu M.J.* 4:928 Dec. 1956

Results of a clinical study of the genesis of chronic paranasal sinusitis of dental origin are reported. Anatomic and roentgenographic investigations on the maxillary sinuses of dead and living bodies led to the following conclusions:

1. The teeth intimately related to the antral floor are the first and second bicuspids and first and second molars, especially the first molar.

2. Thickening of the intermediate layer of the antral floor in roentgenograms represents the pathologic changes of the bone and mucosa.

3. Paranasal sinusitis with dental caries of the upper jaw frequently is of the purulent, putrid type.

4. The nearer the pathologic condition of the periodontal tissue reaches to the antral floor from the tooth, the more frequently is the sinusitis purulent.

5. Examination by antroscope shows that the normal sinus has a smooth surface, with apparent capillaries on the mucous membrane.

6. In chronic paranasal sinusitis, however, the mucous surface is turbid and the capillary vessels disappear.

7. In instances of maxillary sinusitis of dental origin, these conditions remain localized at the antral floor rather than becoming general.

Tokyo Medical and Dental University School of Medicine, Yushima, Bunkyo-ku, Tokyo, Japan

Diagnosis and treatment of pemphigus

Marvin Brodey. *New York D.J.* 22:493-494 Dec. 1956

Until six years ago, pemphigus was a fatal disease with a prognosis of only a few months of life. Since the introduction of ACTH and the adrenal steroids, however, the outcome has been changed, with many patients remaining alive, productively employed and in relatively good health.

Pemphigus manifests itself as multiple discrete bullae and confluent patches of denuded and crusted skin. The oral mucous membrane, scalp, chest, back, umbilicus, axillas and groins and extremities are involved. The oral mucous membranes may be involved as long as six months before manifestations appear on the skin. Lesions, however, do not always appear first in the mouth.

A small punch biopsy from the oral cavity will reveal the pathognomonic signs. The prickle cells of the skin and mucous membrane show an inability to adhere to one another. The "prickles" or "bridges" between the cells disappear, and the cells and nuclei become swollen with a ring of chromatin around their edges and a clear area between them and the central nucleus.

The blisters in the mouth rarely remain intact long enough to provide a complete specimen. Biopsy of a recently denuded lesion at its edge, however, will reveal the necessary pathologic indications.

The treatment consists of giving large doses of steroids. The mucous membranes are the last

areas to become clear. It is not necessary to continue the large doses until the mouth clears completely, since the oral mucosa usually will respond after a period of time on a maintenance dose.

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Histology

Human pulpal reactions following 20,000 rpm preparations with and without coolants

Herbert Swerdlow and Harold R. Stanley, Jr.
Internat.A.D.Res.Preprinted Abs. 31
March 21, 1957

A histologic evaluation was made of the effect of a coolant on the pulpal response of 60 sound human teeth in which cervical cavities (Class V) were prepared with an inverted cone diamond stone at 20,000 rpm. Thirty-three preparations were cut with a water spray and 27 without a spray. The cavities were filled with zinc oxide and eugenol, and the teeth were extracted at intervals ranging from one hour to 36 days. After fixation and decalcification, sections were cut at six microns and stained with hematoxylin and eosin.

Definite injury to the pulp was found in all the specimens extracted after the first 24 hours. Extensive cellular damage and abscess formation, however, were present only in the teeth prepared without a water spray.

An explanation was sought for the finding of "aspirated" odontoblasts in the dentinal tubules. The fact that this phenomenon was not seen in specimens taken shortly after cavity preparation but appeared at the same time as the inflammatory response suggested that the odontoblasts were forced into the tubules by increased intrapulpal pressure rather than drawn into the tubules by suction. Thus, the term "displaced" odontoblasts may be more appropriate.

Extensive damage to the pulp was induced solely by the cutting and grinding of hard tooth structure. This finding suggested that before the effects of filling materials can be evaluated fully, the response of the pulp to operative procedures must be assessed accurately.

National Institute of Dental Research, Bethesda, Md.

Effect of ultrasonic operative procedures on the developing dentition

Leo Zach, Arthur H. Morrison and Gerson Cohen.
Internat.A.D.Res.Preprinted Abs.
71 March 21, 1957

Reports have appeared indicating disruption of amelogenesis and odontogenesis in the continuously erupting incisor of the guinea pig following cavity preparation with an ultrasonic drill. In a continuing study to assay the biologic safety of the ultrasonic machine used in dental operations, Class I and Class V cavities were placed in the newly erupted incisors and molars of young rhesus and Mangabey monkeys. Similar cavities were prepared in already resorbing deciduous teeth to study the possible effect of the ultrasonic drill on resorption and the underlying developing teeth and follicles.

Results in 64 such operations are summarized. Reactions from the cavity preparations were observed in the pulps of the teeth operated on. Pulpal reactions resembled those produced by other operative modalities, and included aspiration of odontoblasts into the predentinal tubules, hyperemia, minute hemorrhagic foci in the zone of Weil, irregular predentin formation, loss of odontoblastic palisading and coarsening of the stroma. No inflammatory exudate was noted in these reversible reactions. No reaction was observed in the funnel-like apical pulp of the secondary teeth, nor was derangement of orderly dentin formation noted. In the unerupted teeth, follicular architecture was undisturbed. Hertwig's sheath was intact to the growing tip and amelogenesis was undisturbed.

It is concluded that no comparison can be made between the reactions observed in the incisor of the guinea pig and those in the incompletely formed teeth of higher orders.

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Biology

Basic aspects of mouth development

C. H. Tonge. *Proc.Roy.Soc.Med.* 50:185-190 March 1957

The mouth develops in unison with the other organs and tissues and cannot be considered without reference to the embryo as a whole. In embryonic and fetal life, the visceral part of the head, including the facial structures and portions of the alimentary and respiratory systems, has a much slower rate of growth and differentiation than the neurocranial part. The primitive oral cavity or stomatodeum forms a portion of both the nasal and mouth cavities, the remainder arising from an inclusion of the primitive pharynx following the breakdown of the buccopharyngeal membrane. During the formation of the boundaries of the oral cavity, fusions occur which involve the frontonasal process as well as the maxillary and mandibular processes of both sides. Failure of growth and union of these components in an orderly and mainly symmetrical manner results in malformations which may involve the face and oral and nasal cavities in varying degree.

The aim of this study of mouth development is to consider the various phases of differentiation, with particular reference to their characteristic features and functional significance. Serial microscopic sections, cut sagittally, coronally and transversely, of 23 human embryos and 16 fetuses, were examined, together with representative wax plate reconstructions. Streeter (1942-1951) conceived the idea of dividing embryonic life into a series of horizons, demarcated as states in development. The material used in this study has been graded in Streeter horizons and the ovulation age of each of the horizons indicated. The material ranges from the fourth week to the fifth month of intrauterine life.

Normal growth depends on the right environment being available at the right time. Any factor —genetic, hormonal, nutritional, general or local —which disturbs the time environment balance will produce abnormal growth. The degree and site of malformation depends on the stage of embryonic development reached prior to the application of the factor causing the imbalance. The formation of the branchial arches, their vascularization, the fusion of processes involved in facial development, the innervation of the mandibular and maxillary processes, the appearance of independent mesenchymal condensations, the differentiation of visceral arch cartilages, muscle masses and bone all take place as a closely integrated pattern.

The material examined suggests that the fusion of the mandibular processes occurs mainly at the ovulation age of 27 to 29 days ± 1. The fusions of processes forming the face and the primitive palate development from the premaxilla occur during ovulation ages 31 to 36 days. The fusion of the palatal shelves of the maxillary processes observed to be taking place in specimens of ovulation age 46 to 52 days is probably completed by the end of the second month. For normal development, it is necessary for these fusion processes to occur at a definite time in embryonic life. If the time of fusion is in any manner delayed, then nonunion remains permanent and continued growth of the separated processes causes them to become even more widely separated.

The differentiation of the submandibular salivary gland was associated with a mesenchymal condensation, an arrangement similar to that found in relationship to the developing tooth (Tonge, 1953). Sucking and swallowing are functions well developed at birth in all mammals, and it seems likely that the structures necessary for these functions will be developed long before they are required. By the end of the third month the pattern of mouth formation is complete; it has commenced to function, and only additive growth and some remodeling occur.

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Prosthetic dentistry

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Miscellaneous

Meba spring articulators

(Meba Federartikulator)

D. D. Balters. *Benda Bl.* 3:23-26 July 1956

Balancing the occlusion for artificial dentures is one of the most important tasks in denture construction. Several technics have been developed to overcome the difficulties that occur even when the design of the denture seems to be perfect.

To make this prosthetic procedure easier, the Meba spring articulator recently was introduced in Germany. This apparatus permits the transference of the correct relationship of the retainers to the cast and at the same time permits an accurate registration of the mandibular positions in their centric, protrusive, and lateral positions. Although this technic has been designed primarily for extensive restorations, it can be applied, at least in principle, to the construction of smaller types of prostheses.

The Meba spring articulator consists of strong spiral springs made of stainless steel which form the vertical supports. The apparatus imitates perfectly the lateral gliding movements of the mandible.

Three types of Meba spring articulators now are on the German market: (1) the original design for complete dentures; (2) a modified design for partial and immediate dentures, and (3) a modified design for crowns and bridges.

In the construction of the spring articulators, stainless steel and chromium plated brass are used. Both metals assure long serviceability.

The bows for the upper dentures are removable, and, therefore, the dentist is not hampered in

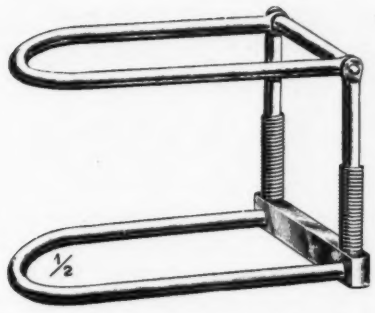

Figure 1 Model A for complete dentures

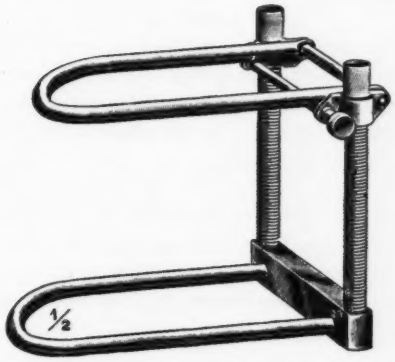

Figure 2 Model B for partial and immediate dentures

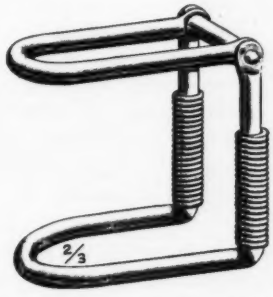

Figure 3 Model C for crowns and bridges

his work. After removal of the reinforcement rods, the flexibility of the spiral springs can be reexamined and adjusted easily, and the occlusion checked.

The advantages of the Meba spring articulators are as follows: (1) the strong spiral springs serve as lateral elastic supports; (2) the lateral, gliding masticatory movements of the mandible are imitated correctly; (3) the apparatus can be kept clean easily; (4) the construction is firm and enduring; (5) the manipulation is not complicated, and (6) the cost is comparatively low.

The only disadvantage is the fact that the apparatus does not always permit adequate reconstruction of the individual masticatory function.

Although the use of the spring articulator is recommended, it is not as essential in fixed partial denture construction as it is in construction of complete dentures. Except when extensive occlusal reconstruction is required to reestablish the normal vertical relationship, it is found that if a sufficient number of natural teeth are present, the exact jaw relationship can be established without the use of this apparatus.

The facets and the interdigitation of the cusps of natural teeth usually permit adjusting these articulators to the existing centric, protrusive and lateral positions of the mandible.

Altes Bürgermeisteramt 93, Walbröl/Nordrhein, Germany

Allergy to synthetic resins, a problematical diagnosis
(Allergie gegenüber Kunststoff als Verlegenheitsdiagnose)

Werner Schubert and Hans Müller. *Deut. Stomat.* 7:88-93 Feb. 1957

Recent statistics show that over 90 per cent of dentures made today are processed from synthetic resins. In addition to heat-cured resins used in the construction of complete dentures, a great deal of acrylic denture relining and repair material is used that is self-cured without application of heat.

Acrylic resins vary widely in manufacture and may contain substantial amounts of plasticizers or additional chemicals. Their physical and other properties differ greatly, and even two portions of the same brand are often dissimilar.

Although much progress has been made in the development of synthetic resins since these materials were introduced to dentistry, there still remain many factors associated with the use of synthetic resins which are not fully recognized.

Reports vary greatly as to the primary irritating and sensitizing potential of these materials in patients, dentists and laboratory workers. Especially controversial are reported incidents of allergy to synthetic materials such as sensitization of the oral mucosa in wearers of new complete dentures made of acrylic resin.

At the Dental Clinic and Polyclinic of the University of Leipzig, Germany, 15 patients (9 men and 6 women) were examined who showed seemingly allergic reactions of the oral mucosa to inserted dentures made of acrylic resin. These "allergies" were manifested by symptoms but were not detectable through allergy tests. In all these instances, the diagnosis "allergy to acrylic dentures" was made by physicians prior to the examination at the clinic.

New dentures, made from the same synthetic materials as had been used in the previous ones, were constructed and inserted. The patients were instructed to wait two or three days before wearing these dentures constantly to permit healing of lesions in the mucous membrane.

In 13 patients, no allergic reactions to the new dentures were observed. In two patients, an intensive reddening occurred in isolated spots in the denture-supporting tissue, probably resulting from mechanical irritation.

The following conclusions were reached:

1. It is possible, although not probable, that dentures made of acrylic resin can and do cause contact sensitization and promote inflammatory reactions in oral tissues.

2. The use of any synthetic material in the human body should still be regarded as an experimental procedure.

3. There are no infallible standard methods for the accurate measurement and evaluation of foreign body reactions in oral tissues.

4. Artificial dentures made from acrylic resins, if properly finished and cured, rarely cause allergic reactions in the oral mucosa.

5. Allergy to synthetic resins, a diagnosis frequently made, is questionable in the majority of instances.

Fiedlerstrasse 25, Dresden A 16, Germany

Irritations of the oral mucosa caused by the addition of coloring matter to acrylic denture materials

(Reizungen der Mundschleimhaut durch Farbzusätze der Prothesenwerkstoffe)

Max Kuck. *Deut.zahnärztl.Zschr.* 11:678-686 June 15, 1956

In dental literature, several reports have appeared in which it has been asserted that irritations of the oral mucous membrane directly below or in the vicinity of the contact points of acrylic dentures were caused by the addition of inadequately tested coloring matter.

At the Dental Institute of the University of Frankfurt/Main, Germany, 22 patients afflicted with severe symptoms of angular stomatitis (stomatitis prosthetica) were examined to determine whether a hypersensitivity of the oral tissue to the coloring matter exists.

These symptoms—an intensive red, edematous mucous membrane; small white spots on the surface epithelium; infiltration of lymphoid cells and leukocytes; acute catarrhal gastritis, and various allergic manifestations—either disappeared or decreased in severity after the colored acrylic dentures were replaced with dentures made of uncolored acrylic material.

Dye concentrations of the coloring matter used to improve the esthetic appearance of dentures were applied to the epidermis (the bend of the elbow) of 18 of the patients. In 11 patients, positive reactions to the dye were observed after from five minutes to three hours. These reactions consisted of subjective complaints by the patient and objective clinically observable symptoms occurring mainly on the mucous membrane and other oral tissue. The allergic reaction on the epidermis, however, was not significant.

In all positive instances, red coloring matter was the causative factor; in two instances also yellow coloring matter was participating in causing allergic manifestations. No reaction to white or blue coloring matter was observed.

The result justifies the assertion that irritations of the oral mucosa can be caused by coloring matter added to acrylic denture materials.

Ludwig-Rehn-Strasse 14, Frankfurt am Main, Germany

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Complete dentures

The incidence of gastrointestinal disorders in edentulous inmates in a work colony

T. Ockerse. *South African M.J.* 30:1188-1189 Dec. 8, 1956

Little is known concerning the incidence of gastrointestinal disorders in edentulous persons, though it is generally believed by dental and medical practitioners that an edentulous state predisposes to such disorders.

Of the 161 edentulous men who were committed to the Sonderwater Work Colony of the Union Social Welfare Department during the period from 1951 to 1956, 128 did not suffer from any gastrointestinal disorders. The time they had been edentulous varied from 2 to 20 years. The remaining 33 complained of abdominal pains after meals, but their gastrointestinal condition was not investigated roentgenographically. These 33 inmates were fitted with dentures, and an apparent recovery was usually observed, since they did not complain subsequently. It was found to be cheaper to fit an inmate with dentures than to convey him with escort to the hospital 28 miles away for a roentgenographic examination.

Of the 33 edentulous inmates who complained of gastrointestinal pains, 26 had been admitted for drunkenness. It could not be established whether the fitting of dentures or the total abstention from alcohol cured the alleged complaint.

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Doctoral and Masters' dissertations

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In this column each month are listed recent Doctoral and Masters' dissertations of dental interest, accepted by the dental schools or graduate schools in partial fulfillment for advanced degrees. Copies of many of these theses are available from the schools through interlibrary loan.

An anatomic study of the sublingual space. *Harry Jennings Dennis. 1957.* M.S. *Georgetown University.*

Histologic changes produced by pressure injection of whole blood into the intermedullary spaces of dog mandibles. *Philip Joseph Holton. 1957.* M.S. *Georgetown University.*

Regeneration of the antral lining membrane. *John Bernard McVeigh. 1957.* M.S. *Georgetown University.*

A survey of results in two types of palatorrhaphy. *Douglas Bruce Heatherington. 1956.* M.S. *University of Michigan.*

Experimental studies on tooth plantation in the Syrian hamster. *Robert Boer Hoek. 1957.* M.S. *University of Michigan.*

Growth of the mandible as related to mandibular prognathism and surgical correction. *John Joseph Pascoe. 1957.* M.S. *University of Michigan.*

Surface conditions of stone in contact with alginate and rubber base impressions. *Martin J. Cain, Jr. 1957.* M.S. *University of Michigan.*

The comparative effect of x-rays on photographic and radiographic emulsions. *Owen F. Makinson. 1957.* M.S. *University of Michigan.*

A cephalometric analysis of mandibular postural change between rest position and occlusion. *Robert L. Vedder. 1956.* M.S. *University of Michigan.*

A roentgenographic cephalometric investigation of the axial inclination of the deciduous maxillary and mandibular central incisors. *H. Sasser Watson. 1957.* M.S. *University of Nebraska.*

The roentgenographic appearance about the root ends of the deciduous mandibular molars. *Jose M. Gonzalez. 1957.* M.S. *University of Nebraska.*

Mandibular morphology in cleft palate and noncleft palate individuals. *Willard L. Flint. 1957.* M.S. *University of Washington Graduate School.*

A serial study of the soft tissue profile of individuals with excellent occlusion. *Stanley Y. Inouye. 1957.* M.S. *University of Washington Graduate School.*

A cephalometric evaluation of the dentofacial changes with specific reference to the mandible, occurring during treatment of Class II, division I malocclusion. *James K. Knell. 1957.* M.S. *University of Washington Graduate School.*

The gothic palate: causes and development in stages (Der hohe Gaumen: Die Auffassungen von den Ursachen seiner Entstehung in den Reihenfolgen ihres Erscheinens). *Rainer Detig. 1955.* DR.MED.DENT. *University of Frankfurt/Main, Germany.*

Clinical experiences with a modified continuous clasp in elastically positioned molars (Klinische Erfahrungen über eine modifizierte fortlaufende Klammer bei elastisch aufgestellten Backenzähnen). *Hans Pieper. 1955.* DR.MED.DENT. *University of Frankfurt/Main, Germany.*

The presence of *Streptococcus salivarius* in alveoli after tooth extractions: its susceptibility to antibiotics (Über das Vorkommen von Streptococcus salivaris in der Zahnalveole post extractionem und seine Empfindlichkeit gegenüber Antibiotika). *Heinrich Caselitz. 1954.* DR.MED.DENT. *University of Hamburg, Germany.*

Cutaneous leishmaniasis: its significance in dentistry (Die Hautleishmaniosen und ihre Bedeutung für die Zahnheilkunde). *Carl Georg Hisznauer. 1954.* DR.MED.DENT. *University of Hamburg, Germany.*

Relation between caries incidence and the formation of the face (Beziehungen zwischen der Karieshäufigkeit und Gesichtsform). *Gerhard Barthel. 1954.* DR.MED.DENT. *University of Leipzig, Germany.*

History of dental drills and files before introduction of the foot engine (Geschichte des Zahnbohrers und der Zahnfeile bis zur Erfindung der Fussbohrmaschine). *Walter Krause. 1954.* DR. MED.DENT. *University of Leipzig, Germany.*

Experiences with test methods in dental practice (Praktische Erfahrungen über Testmethoden in der zahnärztlichen Praxis). *Hans Joachim Bredt. 1954.* DR.MED.DENT. *University of Marburg/ Lahn, Germany.*

Serial examination of school children in Kassel after the introduction of fluoridation in 1952 (Zahnärztliche Reihenuntersuchungen bei Kasseler Schulkindern zu Beginn der Trinkwasserfluoridierung 1952). *Walter Friedrich. 1954.* DR. MED.DENT. *University of Marburg/Lahn, Germany.*

Results obtained by treating headaches with small doses of insulin (Ergebnisse der Behandlung von Kopfschmerzen mit kleinen Insulindosen). *Ursula Hauck. 1954.* DR.MED.DENT. *University of Munich, Germany.*

Investigations of strain phenomena in dental ceramic materials (Untersuchungen über die Spannungserscheinungen an dentalkeramischen Körpern). *Werner Heckmann. 1954.* DR.MED. DENT. *University of Munich, Germany.*

Comparison of the symptoms of "true" and "superficial" conditions of crowded teeth (Vergleichende Untersuchungen über den "echten" und den "Symptomatischen" Engstand bei Gebissanomalien). *Klaus Lösser. 1954.* DR.MED. DENT. *University of Rostock, Germany.*

Root canal treatment with hydroxyl iontophoresis (Über die Wurzelkanalbehandlung mit der Hydroxyl-Ionophorese). *Siegfried Matthes. 1954.* DR.MED.DENT. *University of Rostock, Germany.*

Clinical and experimental examinations of the applicability of wound clips for postoperative treatment after tooth extractions (Klinische und experimentelle Untersuchungen über die Brauchbarkeit von Wundkegeln zur postoperativen Behandlung von Zahnextraktionen). *Hans Joachim Blunck. 1954.* DR.MED.DENT. *University of Tübingen, Germany.*

Measuring the tooth mobility in instances of periodontal disease and its significance in dental practice (Zahnbeweglichkeitsmessungen bei Erkrankung des Parodontiums und ihre Bedeutung in praktischer Hinsicht). *Hans Günther Breitschwerdt. 1954.* DR.MED.DENT. *University of Tübingen, Germany.*

Are the technics used in taking roentgenograms of the skull applicable in dental practice? (Können die üblichen Röntgenaufnahmen des Schädels auch zur Beurteilung von Zähnen herangezogen werden?). *Curt Bernard. 1954.* DR.MED.DENT. *University of Würzburg, Germany.*

Rhythmic tooth mobility in patients afflicted with bruxism and in those free of it (Rhythmische Zahnbeweglichkeitsänderungen bei Knirschern und Nichtknirschern). *Hellmut Hirt. 1956.* DR. MED.DENT. *University of Zurich, Switzerland.*

"Oxycain Wander," a new local anesthetic for dental practice (Praktische Erprobung des Lokalanästhetikums "Oxycain Wander"). *Hans Jörg Aufdermaur. 1955.* DR.MED.DENT. *University of Bern, Switzerland.*

Development of nasal fossa and palate in human embryos between 13 and 37 mm. crown-rump length (Ein Betrag zur Entwicklung der Nasenhöhlen und des Gaumens bei menschlichen Embryonen von 13 bis 37 mm. Scheitelsteisslänge). *Brigitta Pinthus. 1955.* DR.MED.DENT. *University of Zurich, Switzerland.*

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